

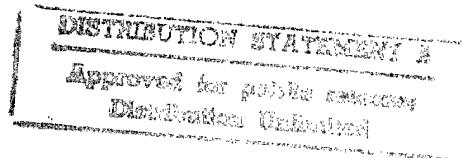
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# East Europe Report

## ECONOMIC AND INDUSTRIAL AFFAIRS



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27 April 1984

**EAST EUROPE REPORT**  
**ECONOMIC AND INDUSTRIAL AFFAIRS**

**CONTENTS**

**CZECHOSLOVAKIA**

Environmental Problems in North Bohemian Basin Viewed  
 (Josef Jirat; HOSPODARSKE NOVINY, 3 Feb 84) ..... 1

**HUNGARY**

Commerce Official Rebuts Hegedus' Views on Enterprises  
 (Szvetozar Milanovics; NEPGAZDASAGI SZEMLE, Mar 84) ..... 13

Credit Policy Viewed: 1983 Results, 1984 Tasks  
 (PENZUGYI SZEMLE, No 3, Mar 84) ..... 21

Development of Competitive Price System Discussed  
 (Laszlo Racz Interview; FIGYELO, No 10, 8 Mar 84) ..... 30

Bureau Established for Making Loans to Entrepreneurs  
 (Breitner; FIGYELO, No 10, 8 Mar 84) ..... 35

Shortcomings in Financial Institutions: Business Policy Viewed  
 (Ildiko Cseh; FIGYELO, No 11, 15 Mar 84) ..... 39

**ROMANIA**

Energy Production, Utilization Discussed by Experts  
 (N. N. Constantinescu, et al.; ERA SOCIALISTA, No 1,  
 10 Jan 84; No 4, 25 Feb 84) ..... 42

CZECHOSLOVAKIA

ENVIRONMENTAL PROBLEMS IN NORTH BOHEMIAN BASIN VIEWED

Prague HOSPODARSKE NOVINY in Czech 3 Feb 84 pp 8-9

[Article by Eng Josef Jirat: "Environmental Problems in North Bohemian Lignite Basin"]

[Text] The environment is the focus of increasing attention in the CSSR, and rightly so. Human activity upsets the ecological balance; as long as this intrusion is not extensive, nature itself can deal with it. Otherwise man must take steps so that his activity does not turn against him. One of the areas on which increasing attention must be focused is the North Bohemian lignite basin. Next to human health and future development, economic arguments also speak in favor of environmental improvement.

Industrial development thus far has also produced considerable deterioration of the environment. Seeking a rational solution and being aware of the fact that environmental protection is one of our most relevant social tasks, the Government of the CSR by its decision No 315 of 1974 identified the seven most important residential and industrial areas in the CSR in which most of the negative effects are concentrated (the North Bohemian Lignite Basin, Prague, the Ostrava-Karvina Basin, the Sokolov-Karlovy Vary area, Pilsen, Brno, the Hradec Kralove-Pardubice conurbation). Pursuant to Decision No 76/1980 of the CSR Government, the Melnik-Kralupy-Neratovice area was also included in this category in 1980. The purpose of these measures is to give the affected areas priority over other parts of the CSR in national economic planning, capital investment, health care and compensatory programs and in research of remedies, and thus to deal here with environmental protection on a priority basis.

The effort to ensure this priority conceptually is also reflected in other decisions of the CSR Government, which in its third session in February 1977 recognized the set of measures for the development of environmental creation and protection in those areas up to 1980, and by Decision No 58/1982 adopted a program for the gradual implementation of a solution to create and protect the environment in the affected areas in 1982-1985.

Remedial Program

The conflict between production and the residential, work and recreational environment in our country reached its peak in the North Bohemian lignite

basin. The affected area includes the territories of the okreses of Chomutov, Most, Teplice, Usti nad Labem and since 1980 also the southwestern part of the okres of Decin. The high concentration of mining operations, sources of power generation, industry, transportation and population has produced a number of serious problems for environmental protection.

This area ranks among the foremost in the CSSR in intensive industrial production. Industrial development here is based on the mineral wealth; however, its exploitation also fundamentally affects the population and its development (appropriation of lands, limits on construction, protected zones of ore deposits) and the natural environment (strip mining, liquidation of the vegetation cover, interventions in the system of underground and surface waters, dust, noise, etc). Open-cast lignite production covers the largest area and completely predominates (more than 50 percent of the CSSR production); mining of accompanying raw materials, such as heat-resistant clay, bentonite, silicone, ceramic clays and, furthermore, tin, wolfram, lithium and fluorite, is also important. The next link of lignite mining is power generation and chemical and other energy-intensive industry. The sources of electric power reached their highest concentration here. Their installed capacity amounts to almost 5,300 MW (not including thermal plants in factories) and generates more than 30 percent of all electric power in the CSSR. The pressure gas plant in Uzin and the Chemicke Zavody [Chemical Plants] in Zaluzi produce 1.3 billion cubic meters of lighting gas per year (1982), and thus they rank among the most important producers of that substance in our country.

The density of the population in the basin is 214 residents per square km, but the distribution of the residents is very uneven and directly dependent on the configuration of the terrain and the consequent economic exploitation of that territory. The density of the population in the basin where most of the industrial potential is located amounts to nearly 700 residents per square km; 70 percent of the population in this area live in 10 towns with population over 10,000.

The party and state authorities continue to focus increasing attention on the solution of environmental problems in this area. Among the most important documents adopted in recent years are CSR Government Decision No 91/1976 and Presidium of the CSSR Government Decision No 252/1976 on the comprehensive solution of environmental problems in the okreses of the basin in the North Bohemia kraj for the 1976-1980 period, which approved above all the comprehensive set of measures and the schedule of investment programs for the years 1976-1980, and Decisions No 224/1981 of the Presidium of the CSSR government and No 310/1981 of the CSR Government on the proposal of a district plan for national economic development on the territory of the North Bohemia kraj in 1981-1985.

The governments of the CSSR and CSR proceeded from the premise that a comprehensive growth of production must be ensured in the area of the basin (fuel and electric power, chemistry) and the negative consequences of that

growth must be offset; preferential policies of the investment type must be applied in order to cancel the negative effects on the quality of the environment. In the Sixth 5-Year Plan, therefore, main attention was focused on mitigating air pollution, on recultivation of the landscape after the conclusion of mining operations, on better health and social care of the population, in particular of children, on restoration of healthy environment in residential areas by developing a central heating system, on the construction of a fail-free water supply of adequate capacity, on cleaner streets and communications, on investments in technical infrastructure related to pit mining, including restoration of communities in the basin.

The program for the environmental protection policy in the basis in the Seventh 5-Year Plan proceeds from the fact that:

--in the foreseeable future the spread of lignite coal deposits and the location of power plants and chemical industry do not permit any fundamental economic changes in the deployment of those branches;

--some technical measures aiming at better environmental protection are not yet efficient enough and extremely demanding in terms of economy and investments, and require a protracted period of implementation;

--in comparison with the past, our national economic opportunities for investment are limited;

--the most powerful effect is generated by policies that are mutually interrelated in a unified system, that function comprehensively and are mutually complementary.

Our program is therefore focused primarily on achievable liquidation of the sources that damage the environment and, at the same time, on improving the environment. Furthermore, it is focused on preventive protection of the residents' health and on compensation for the deteriorated living conditions.

#### Air Pollution Is a Problem

The most serious problem in the North Bohemian Lignite Basin is the toxic effect of air pollution. Air pollution develops in direct relation to the increase in mining operations and to the type of burned coal. On the average, with the transition to new pit areas, the caloric value of the coal declines, but at the same time the contents of ash matter and sulfur increase.

The principal source of pollution are burning processes which produce roughly 72 percent of the solid and 79 percent of the gaseous emissions. During the Sixth 5-Year Plan solid emissions slightly increased due to insufficient renewal and upgrading of separating facilities which had been successfully installed in the early 1970's in almost all major polluters.

The measures (Decision No 273) adopted as the operation plan by the CSSR Government in 1978 positively affected further development. In 1979-1980 the Federal Ministry of Metallurgy and Heavy Engineering stepped up repair service of the separating facilities in Usti nad Labem, and since 1980 it covers on a priority basis the requirements for separators and spare parts for the construction and repairs of separators in the basin. The Federal Ministry of Fuels and Energy accelerated the drafting of the program for the reconstruction of separating facilities in power plants. According to the mandatory program, during the Seventh 5-Year Plan it will undertake the reconstruction of separating equipment in 14 units of 4 power plants; Kcs 200 million will be invested to reduce the escape of solid emissions by about 82,000 tons annually. Thus far units No 3 and 4 in Tusimice, units No 4 and 1 in Podebrady, and unit No 4 in Ledvice have been overhauled. Although the efficiency of these measures has not reached projected values in every location, they should contribute in a decisive manner to the overall decline of solid emissions in the basin.

The main problem in improving atmospheric purity is the reduction of sulfur dioxide emissions, especially from its largest sources. Since the 1960's, desulfurization of waste gases from giant power plants has been a topic of intensive research and numerous discussions. Finally, after considerations of various methods, the interministerial group of experts proposed the Soviet magnesite method.

Therefore, by its Decision No 20/1981, the Presidium of the CSSR Government approved the construction of an experimental desulfurization facility according to the Soviet technical model for one unit of the 200 MW power plant in Tusimice. The investment budgeted at more than Kcs 1 billion was introduced as a mandatory task in the third quarter of 1983. With the projected 95 percent efficiency of the desulfurizing process about 40,000 tons of sulfur dioxide will be arrested annually in regular operations of the unit, and from them about 60,000 to 70,000 tons of sulfuric acid will be produced. In addition, other selected methods of desulfurization of waste gases remain under consideration.

Additional installation of such facilities in giant power plants will depend on the results achieved in Tusimice, on environmental development in the basin and on national economic opportunities because, as a matter of fact, in advanced industrial states desulfurization of waste gases is no longer a question of potential technical solution but rather an economic problem (markedly increased investments and operational costs).

Nevertheless, some other possible methods of burning inferior coal with the least environmental impact are under study, among them above all the so-called fluid combustion method, in which desulfurization takes place already during the burning process proper.

The experiments thus far have been promising and, therefore, efforts are under way to design and build expeditiously a model boiler with a capacity of 25 tons of stems/h (20 MW) in the Trmice heat plant; the boiler is

scheduled to begin operation in 1984. Not only the principle of fluid combustion but primarily the elements of construction of the fluid boiler with accessory equipment (circuits crushing the fuel and limestone, dosing, ash treatment, dumping, etc.) will be tested in Trmice. The resultant experience will be applied in the design of a basic series of boilers with higher capacities for boiler rooms, heating and power plants.

#### ...For Which the Solution Is Known

Radical solutions to desulfurization of waste gases are sought also for other sources of pollution. Facilities for desulfurization of generator gases are under construction at the cost of Kcs 63 million in Valcovny Trub a Zelezarny [Pipe Rolling Mills and Iron Works] in Chomutov. Their completion is scheduled for December of this year.

The construction of desulfurizing facilities for expansion gases, including the elimination of obnoxious odors, which will cost Kcs 165 million, has been launched last year in the Antonin Zapotocky Concern in Uzin; it seems that the test run of the equipment will start in October 1984. Thus, sulfur dioxide emissions will be cut about 5,500 tons per year to 20 percent of the original situation and hydrogen sulfide to 1 ton per year, which is 0.8 percent of the original situation.

A highly efficient method for the liquidation of diffused sources of environmental pollution in the basin is the construction of a central heat system. The heat plant in Komorany was completed in 1978 and residential settlements in Chomutov-Jirkov and Most-Litvinov were linked to it. Another source of heat will also be completed here in 1984 and gradually the system of primary heat feeders is being built for the new housing construction in the Jirkov-Binarice area. Power Plant I in Prunerov supplies heat to Klasterec nad Ohri and the power plant in Tusimice to Kadan. At present Power Plant I in Prunerov is being adapted for heat supply and the capacity of conduits for Klasterec nad Ohri is being expanded. The boiler plant in Chanov began operation in Most in 1981 and several heat feeders are now being prepared for operation.

Heat has been supplied to Teplice since 1980 from a new heating plant in Novosedlice. Most of the primary heat distribution systems will be completed during this 5-year plan. The construction of heat feeders for heat supplied to Teplice from the rebuilt power plant in Ledvice is scheduled to begin in 1985. The Trmice heat plant in Usti nad Labem is gradually being enlarged and after its completion in 1983 [as published] the factory heat plants of the Severoceske Tukove Zavody [North Bohemian Fat Processing Plants] and of Tonaso in Nestemice will also be utilized.

The construction of the central heat supply system at total budget costs of almost Kcs 750 million will be launched in the basin in the Seventh 5-Year Plan. While in 1980 a total of 29 percent of all housing units in the basin districts received their heat supply from the power system, this share should rise to 45 percent when the planned projects are completed.

Lesser sources of air pollution are switching to higher-grade fuels in order to improve the atmosphere. This should upgrade the conditions especially in old neighborhoods. For example, in the Sixth 5-Year Plan the boiler plant of the Elektrotechnicke Zavody [Electrical Engineering Plants] in Bystrany switched to light heating oil, and tunnel furnaces in Karlovarsky Porcelan [Carlsbad Porcelain Facoty] in Most, the boiler plant in the Julius Fucik Spa in Teplice and the purifying baths in Teplice to gas. Last year the heating system of glass tubs in the Sklo Union [Glass Union] in Lesni Brana was converted; gasification of the spa in Dubi is in the planning stage. Several compact boiler plants of the housing administrations in Teplice, Bilina and other towns have been converted to gas. Of the planned volume of Kcs 55 million earmarked for rebuilding and completion of the construction of the gas pipeline in selected towns of the basin in the Seventh 5-Year Plan, works in the amount of 18 million were completed in 1981 and 1982; the plan for 1983 amounts to Kcs 11 million.

The consumption of higher-grade fuels in the economy of national committees increased from 1976 to 1980 as follows: light heating oil from 47,400 to 57,100 tons/year, and gas (procured wholesale) from 53.5 to 63.6 million  $m^3$ /year. In view of the current negative balances of higher-grade fuels in the Seventh 5-Year Plan, however, further changes in the fuel bases in our area have been partially restricted.

To reduce the concentration of pollution in accordance with Decision No 19/1981 of the Presidium of the CSSR Government, a prognosis and signal system of environmental conditions was introduced in the basin in 1981. Control measures are announced whenever a certain degree of sulfur dioxide concentration has been reached or under unfavorable meteorologic conditions. The electric output in the basin is then cut 500 MW below the daily schedule for the operation of the units in the weekly program; common fuels are replaced with better-grade fuels in four selected giant power plants and in the Chemicke Zavody in Zaluzi, and emissions in additional major industrial sources of pollution are reduced by operational measures.

Because during its 2-year operation the system proved successful and turned into a very important step for improving the environment in this area, the Ministry of Forestry and Water Economy in the CSR, as the coordinating project manager in charge of air pollution in the CSR, will introduce expeditiously an improved system for the automatic monitoring of emissions during the winter of 1984-1985. Similar systems will also be installed in other selected areas.

The complex of all measures for improving the atmosphere has already produced results. Despite many problems in the most important towns in the basin, a turn for the better is under way in the development of such emissions as sulfur dioxide and soot. This trend should continue also in the future. A difficult situation remains on the hillsides and hilltop plains of the Krusne Hory range, where primarily the forest growth has

suffered serious damage. In relation to the development of the damage, random sanitary cutting of evergreens also increased to 592,500 cubic meters of common logs in 1980, and the area of the reforestation program was expanded to 2,535 hectares.

The prematurely dying forest growth and the necessary liquidation of the latter have affected the biological substance of forests in the entire area, with all attendant detrimental consequences (diminished water economy, functions of the forest in terms of soil protection, hydroclimate, recreation and hygiene). By the same token, it is extremely difficult to plan the management of such forests because air pollution and its consequences vary extensively due to numerous factors.

The current concept of the State Forest Administration, discussed by the CSR Government in 1980, proceeds from the need to cut down expeditiously the endangered forest growths in order to reduce the losses of wood pulp as much as possible. Another fundamental--and in the long run, the most essential--task with which our forest economy must cope here is reforestation. Prickly spruce and other types of spruce and dwarf mountain pine, and--of the deciduous trees--mainly birch, mountain ash, green alder and other trees, are being planted on the cut areas, but it is hard to reforest large areas with extreme climatic conditions, ones are often flooded or exposed to attacks of rodents.

#### Milestones of Success

Problems of water economy on the territory of the basin are being resolved with considerable success. A comprehensive, long-range solution of the affected system of surface waters in the central part of the basin used a system of replacements for the water reservoirs in Drinov. The original natural system of water mains and sources of drinking water which the mining operations had disrupted and which was affected by the loss of the underground water level has been successfully replaced. The completion of the reservoir in Prisecnice and its connection with the water main system in the center of the basin basically resolved the supply of drinking water. The reinforced water main system in Usti nad Labem and its link with Teplice and Litomerice will provide full capacity supply.

The facilities of the water main networks in the okreses of the basin are among the foremost in the CSR. More than 95 percent of the population here are supplied with drinking water. The center of the kraj, Usti nad Labem, is among the first in the CSSR, with 99.38 percent of the population supplied with drinking water from water mains. Because of the concentration of the housing construction and intensive rebuilding of town centers, the share of the population whose houses are connected with public sewer systems is also very satisfactory. More than 85 percent of the population in the basin live in houses connected to public sewer systems.

Nevertheless, the situation of waste water purification is not satisfactory; the share of purified sewage and industrial waste waters remains very low. Capital investment thus far could not improve this situation to any notable degree. The waste water purification station for Teplice and its vicinity was completed in 1976, others were build in 1977 in the Spolek pro Chemickou a Hutni Vyrobu [Association for Chemical and Metallurgical Production] in Usti nad Labem and in Vejprty, and one was remodeled in 1982 in the Valcovny Trub a Zalezarny in Chomutov. Within the framework of the building of the Giant Coal Open Cast of the Czechoslovak Army in 1982, the construction of a purification station for mine waters was launched at a cost of almost Kcs 100 million; it will improve the quality of the water in the Bilina river. The construction in Valcovny Trub a Zalezarny, the Julius Fucik Plant in Chomutov, in Severozapadni Drah [Northwestern Railroad] in Usti nad Labem and the waste water purification station in the power plant in Ledvice, which has been postponed on several occasions, are scheduled to begin in 1985.

A new problem which might affect the operations and functions of the water economy system in the basin somewhat unfavorably in the future stems from the consequences of deforestation of the hilltop plains in the Krusne Hory, and from increased water acidity.

A specific problem of the basin is the devastation of the countryside, particularly of its surface, by strip mining of lignite. Strip mining leads to serious changes in the landscape. Agricultural and forest lands are appropriated, water areas, whole communities and industrial plants liquidated, and brooks and rivers, engineering networks and routes of communications are moved. Almost 22,000 hectares of predominantly agricultural areas have been appropriated.

In 1957, recultivation programs began on about 300 hectares and gradual annual increases reached their peak in 1961 (with the beginning of works on 700 hectares) and in 1972 (800 hectares). Since then, the scope of works has either stagnated or declined. Of the 3,580 hectares, 57.5 percent have been returned for permanent use as agricultural areas. At present 4,130 hectares are undergoing recultivation. However, at least 3,700 hectares are scheduled for appropriation during this decade.

In the past decades the quality of the whole process improved considerably. The share of lands covered with fertile soil increased and the programs for improvement of the water system became routine. When planting new forest areas, the share of economically usable kinds of trees increased; intensive cultivation during the stage preceding the transfer of the areas to their final users is now a rule. Programs for recreational use of such locations are expanding.

In recent years, however, recultivation has been considerably impaired by the failure to fulfill the plan for mining in new capacities and by the prolonged exploitation of old open-cast quarries, which delays the transfer of the released areas, while on the other hand accelerated mining

operations and the expanded volume of the removed overlying soil speed up the land appropriation program. A shortage of heavy trucks has generated problems with regard to the fulfillment of the plan for removal of the stripped topsoil. A major negative factor concerns the aggravated disproportions between the size of the areas that are being appropriated and the areas included in the recultivation cycle.

Therefore, in order to mitigate the consequences of mining, a so-called supplementary recultivation program has been introduced in areas unaffected by pit mining. This involves the technical and biological adaptation of lands or agricultural organizations or the purpose of improving their fertility. In addition, a whole program of supplementary recultivation was prepared for the Seventh 5-Year Plan, and within its framework parks, forest groves, suburban and urban green areas, protective strips of greenery, recreational areas, etc., are being organized. In order to upgrade the land fund, less fertile agricultural lands are now being covered with the topsoil removed from strip-mined areas.

In comparison with all other measures aimed at a better environment in the basin, recultivation is often the fastest and frequently also the cheapest remedy. Its visual effect on vast areas is pleasing and the external harmony in the landscape is psychologically soothing, but above all, the land returns to its original purpose.

#### Prevention for Children's Sake

The objective of environmental protection is to achieve a balanced development in man's impact on his environment and vice versa. The achievement of that objective, however, is a long-range issue because this kind of protection is neither simple nor cheap. Many technical measures seeking to improve the situation are still having a limited effect and often are slowly implemented.

Therefore, along with the gradual solution of the fundamental tasks of environmental protection, compensating measures must be introduced above all in the affected areas. In our country, measures for preventive protection of citizens' health and compensation for the aggravated conditions have been implemented for quite some time and also in the most comprehensive fashion precisely in the North Bohemian basin.

The following are among the most significant compensatory program: assignment of children and students to open-air schools; assignment of more students to recreational institutions in our country and abroad, to children's resorts and balneological institutions; free snacks served to children and students during the school year; saunas used to build up resistance to diseases in children; higher allotment of passes for selective recreation in our country and abroad and for recreation connected with spa treatment; the best possible conditions for recuperation, etc.

One of the fundamental prerequisites for appropriate effects of open-air schools on children is a certain regularity which is determined by the number of facilities suitable for that purpose. The best circumstances are created where the district national committee in question owns single-purpose open-air schools and uses them for children's excursions throughout the year. However, until recently such cases were more or less exceptional.

A fundamental change took place during the Sixth 5-Year Plan when the decision by the commission of the CSSR and CSR governments on solving problems of the development in the North Bohemia kraj served as the basis for the program for the construction of open-air schools for children from the lignite coal basin. Buildings of that type were approved by the CSSR Government as mandatory tasks of the state plan. The construction of 5 open-air schools with total capacity of 1,450 places was then gradually launched in the Sixth 5-Year Plan. That program is being implemented also in the Seventh 5-Year Plan. An additional 6 schools with a capacity of 2,500 places are either under construction or in the planning stage. At present, the district national committees in the North Bohemian lignite basin are managing a total of 22 open-air schools with a capacity of 2,260 places. In 1985, no less than 23 facilities with a capacity of 2,750 places will be enjoyed by 35,000 children. Major facilities will be acquired in the future by renting recreational establishments and Pioneer camps of the ROH [Revolutionary Trade-Union Movement]. The conclusions of long-range studies of the condition of children's health confirmed that the stay in open-air schools benefits children's health (for example, improved erythrocyte count).

Another compensation program is in the form of snacks offered free of charge to all children and students in nursery, elementary and special schools as supplementary sources of proteins and vitamin C. In 1982, the costs of this program in the basin amounted to Kcs 45 million; they follow an ascending trend. The problem is that the selection of the snacks exceedingly depends on the situation in the market; the choices are occasionally repetitious.

Among the system of therapeutic measures is the program of pediatric services which improve the nonspecific resistance of children in collective children's institutions. The program of building up children's physical endurance in saunas is being gradually expanded and saunas are being build especially in nursery schools. Experience has confirmed that common respiratory ailments in children may be significantly reduced by well organized body-building programs.

#### ...Health Protection for Everybody

Next to children's health care, health protection for other strata of the population is naturally the focus of attention. When the Czech Trade Union Council assigns passes for selective recreation in our country and abroad, it gives the North Bohemia kraj a bonus in the amount of 10 percent of its own recreational base. The kraj trade union council grants the same privilege to the okreses in the basin.

The situation was also positively affected by the supplement listing the indications of diseases entitled to balneological treatment, which the CSR Ministry of Health issued on 1 January 1982. During 1982, more than 4,800 employees were treated for diseases of the respiratory tract, motor and nervous systems.

Nevertheless, ample untapped assets exist in the health care system for working people directly in the plans. Enterprise programs for workers' welfare are focusing mainly on expensive and limited opportunities for recreation abroad in which the necessary number of employees cannot regularly participate, while advantageous and needed health care facilities, such as convalescent homes or overnight sanatoria for adults and teenagers, have not been organized on an appropriate scale.

Health care facilities, including hygienic services, are gradually being furnished with the most sophisticated technical equipment. Thus, for example, an imported whole-body computer tomograph, six artificial kidneys and other medical technology were put into operation in Usti nad Labem this January. However, the number of physicians in this kraj could not be thus far increased.

In view of the fact that recreation may compensate in part for environmental shortcomings, care for well-spent leisure time and creation of favorable conditions for recreation of the population in the basin have become important therapeutic measures that should provide conditions for the greatest number of local residents to spend as much time as possible in recreational facilities outside the affected areas (especially during the periods of the highest air pollution, i.e., from October through March).

Among the most successful forms are, for example, trips in the fresh air. Municipal national committees organize regular one-day bus excursions to recreational areas during the year and on weekends at greatly reduced fares. In 1982, almost 165,000 citizens of the basin participated in such trips for which subsidies of Kcs 4.2 million were granted from funds received [in fines] for air pollution. Similar excursions should be offered by every major enterprises to their employees.

The system of methods for grants of certain compensations mainly with regard to the stabilization of work forces has been extended also for this 5-year plan.

Among these are, for instance, grants of loyalty stabilization awards, which in 1982 were paid to 125,000 workers and which amounted to a total of Kcs 250 million, and contributions for the building of family homes; contributions for recruitment were adjusted to some extent and the possibility of special increases of the movable wage factor was studied, etc.

Experience thus far has demonstrated that as long as compensatory measures are comprehensively applied, they fulfill their purpose; however, they are a somewhat temporary solution with which the same effort must be made to implement other policies of environmental protection.

Environmental conditions in the North Bohemia Lignite Basin are not a simple matter. Radical measures adopted in recent years and the results of the first 7 years of the Seventh 5-Year Plan are proof that the path taken is correct. Emissions of sulfur dioxide and flying soot are declining in the most important towns in the basin; on the whole, solid emissions will decrease during the 5-year plan. The policy for preventive environmental protection of our population's health and the compensations for the aggravated living conditions have been significantly intensified.

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HUNGARY

COMMERCE OFFICIAL REBUTS HEGEDUS' VIEWS ON ENTERPRISES

Budapest NEPGAZDASAGI SZEMLE in Hungarian Mar 84 pp 339-345

[Article by Svetozar Milanovics, adviser to the Commercial Organization Institute: "Enterprises and Socialism--Thoughts on Andras Hegedus' Thoughts"]

[Text] When I read the title of Andras Hegedus' article on the new cover of KOZGAZDASAGI SZEMLE, I turned the pages to the article impatiently and with hope. And in truth, Andras Hegedus' exposition was deeply interesting and provocative to thought. The author formulates his thoughts on a book of Erzsebet Szalai's [Special Enterprise--Investment Interest." Having read the article, my impression was that Andras Hegedus was making judgments rather than thinking. He was making judgments without trying to prove the truth of his positions by a single argument or fact. And no matter how much I agree with several of Andras Hegedus' recommendations, I must dispute him because it is not all the same whether we make our judgments subjectively or with fidelity to reality in regard to large enterprises which have played such a key role for decades in the development of Hungarian society and economy and which at present also may play and are playing such a basis role in overcoming the economic difficulties of the country.

For decades I have been occupied with socialist undertakings and enterprises. as an enterprise worker and a researcher in and a writer on the enterprise organization. I have known and still know managers who are below the necessary and possible standard and also some who are personalities in the most recent history of Hungarian society and economy and who have earned undying merit in the economic development of their enterprise, their region, the economic subbranch and the whole country. It is indisputable that this managerial subclass (not only managing directors, directors and chairmen, but also their deputies and closest colleagues: the secretaries of party organizations, trade union committees and KISZ [Hungarian Communist Youth League] organizations, consists qualitatively of many layers. It is also an indisputable fact that the prevailing vast majority of these managers are

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\*\*"Large Enterprises and Socialism" (Thoughts on Reading Erzsebet Szalai's Book), KOZGAZDASAGI SZEMLE, 1984 No 1.

talented and respected entrepreneurs. The best proof of this is that in the rapid environmental, economic, economic-political, condition systemic and legal changes of recent decades they have been able to assure the stability of the country's economy and its exemplary commodity supply and at the same time the development of the country--in light of its endowments.

With the foregoing, I have already "earned" from certain persons the title of an enterprise--but not large enterprise--"apologist." But I herewith note that apologetics is more than nihilism, because it defends something, and in this case not merely anything. Even knowing that some will brand me as an apologist, I feel it is necessary to write down the thoughts formulating within me as I read Andras Hegedus' article.

#### The Problems and the Truths

When we encounter a multitude of problems, it is easiest for us to refer to causes outside of ourselves, and most difficult to discover the actual causes and truths. We cannot lose sight of this when we are thinking of our present problems, their causes, and the possibilities of solution.

1. One cannot make a judgment about socialist enterprises, or about socialist large enterprises on the basis of a book which speaks only of special enterprises and their investment interests. Not even if the author perhaps strove to draw general conclusions. In fact, all large enterprises do not belong to the "special enterprises" category, and investment interests are not only characteristic of the "special enterprises." Moreover, the scope and composition of special enterprises is variable even as the enterprise dimension structure of the national economy is variable.
2. The concepts of an enterprise and a factory belong to different economic, technical and structural categories, and these two categories are not interchangeable. I emphasize this because on the basis of a book on special large enterprises Andras Hegedus makes a judgment on large enterprises, and on the basis of his judgment regards it as necessary to develop "in the Hungarian economy a more rational structure in respect to factory size," which "would make it easier for the economy to adjust more flexibly to increasingly more difficult foreign conditions and increasingly more complicated domestic conditions." According to domestic literature the size of enterprises in Hungary is one-sidedly "large" while according to standard (based on many-sided research and comparisons) views Hungarian factories are smaller than the optimum size. Here I will note: as long as capital concentration has a determining role in respect to enterprise dimensions, technological, supply, etc. factors will have a basic role in respect to the optimum factory size.
3. In respect to the dimensional structure of Hungarian industrial and in general Hungarian socialist undertakings, it cannot be said that the large enterprise character was invented by the building of socialism. It is a well-known fact that earlier, too, in the whole of the Hungarian economy large agricultural holdings and industrial large enterprises had a dominating role. The importance and the role of large enterprises was greater particularly in the industrial field. If we were to study how many Hungarian

enterprises there were among the, let us say, 500 largest European large firms, and how many would be on such a list today, it would become evident that the Hungarian enterprises were more proportionally represented at that time than now, when the participation of the Hungarian economy in the world economy is greater than it was before the war. And yet it is well known that the giant national and multinational enterprises rule the terrain on international markets.

4. The dimensional structure of enterprises is not exclusively a national category. This truth is being gradually implemented in socialism. Independently of this, I do not regard as factual and correct the comparison which Andras Hegedus makes in respect to Hungarian and Polish large enterprises. A whole series of mistakes are to be discovered here, because the size of Poland and Hungary, the geopolitical and geographical endowments, the property structure of the means of production, and the economic and economic-political concepts show significant differences. Moreover, the onetime leadership of the Polish state and party implemented basically different practices (which naturally have extended their influence also on the enterprise sphere) than the Hungarian party and government. The Hungarian practice is a positive example, and the practice of the Gierek-type Polish leadership a negative example.

5. The classifying of certain views as "pseudoscientific apologetics" is not a new matter. Objectively, enterprise and large enterprise concern and defense against unfounded attacks exists and is still increasing. I regard the following statements of Andras Hegedus as such an attack: "The large enterprise managers in Hungary bear a collective responsibility for the large-scale indebtedness of the country, the development of a situation in which an increasingly substantial share of the very slowly growing national income goes for interest and repayment of loans from capitalist countries without our receiving considerable benefits from accepting these loans." I regard it as most curious that as a sociologist Andras Hegedus speaks of collective responsibility in regard to a leadership subclass which does not even have the possibility of paying workers as much in wages as such cooperatives are able to pay "which frequently live on the contract work these do for large enterprises" although according to Hegedus these managers "have personal power and money means that are uncontrolled." We are dealing here with a fatal confusion of cause and effect, but I do not want to deal with this at greater length because I do not want to row into the waters of sociology.

6. The making of a diagnosis in economics also requires great responsibility. A bad diagnosis only increases our difficulties. I regard the system of thought expressed by Andras Hegedus as such a diagnosis, particularly the following: "One of the most serious chronic illnesses of our economic life is that large enterprises which may rightfully be called entrepreneurial empires in respect to the size of a small country find themselves in a changeless immobility (perhaps in quasidynamism), and the managers keep weaving and pampering their ambitious plans, holding their "seminars for the political and economic leaders who visit them as though they were still writing 1972." Only he is capable of seeing reality who senses the processes

of reality from within, studies it, and is a part of these processes. Andras Hegedus calls that condition a chronic illness which either does not exist or is not even an illness. He sees dynamism as immobility. That our development is not going in the direction we would like is not proof of immobility. The relationship between economic and political leaders, on one hand, and enterprise managers, on the other, is not an invention of the large domestic enterprise managers (particularly not for the holding of seminars--although such seminars could be helpful to more than one critic of enterprise behavior) but is a natural accompaniment of the capitalist and socialist economies. There is more need for this now than in 1972. It is in our vital interest to judge actual processes realistically, and to discuss results and dangers in a timely way. For this, dry statistics are not enough, not even a book, although it may be the result of basic work.

7. It has been a thankful job in recent years to write about the antireform attitudes of large enterprises. In this respect Andras Hegedus summarizes what he has to say with striking conciseness: "...a consistent economic reform is inconceivable if the large enterprise structure is left unchanged"; and then "...most of the large enterprise managers--independently of their mentality--are antireform for structural reasons." It is true that a subgroup, an occupational group and role group can be objectively antireform even if its members individually and subjectively are not. But in such a case it would be proper to disclose the reasons that evoke such a "collective" behavior,. It is a mistake, however, to seek for this condition in the "large enterprise structure," particularly in the "ambitious" plans of the managers. In this regard, L. Abalkin expresses profound thoughts in the 14 November 1983 edition of KOMMUNIST when he states: the ultimate meaning of all the work promoting the improvement of the economic mechanism is that better, more favorable conditions should be developed for successful activity in the basic cells of the economy because here and only here are use values created in all their wealth and variety, the national income. Unfortunately, in bringing about the domestic economic reform less concern was shown for this basic requirement than would have been needed. An investigation of the causes, however, indicates that the country's industrial and agricultural enterprises are not even aware of such a benefical effect from the reform. We must search for the cause not primarily in the enterprise managers but mostly in the effect of the reform on the enterprises. In this connection, the script of advertising and desire is of secondary importance and basic is the objective consequence expressed in the social, material and moral prestige or loss of prestige among the enterprises, collectives, managers and workers.

These are the basic questions which we must debate with Andras Hegedus and all those who with snatches from the whole of the Hungarian economy and on the basis of certain phenomena judge and pass harsh judgment on large enterprises. This is all the more necessary because all attempts are doomed to failure which search for "those responsible" in certain basic economic processes and which try to establish a solution by granting licenses. It would appear these methods and ideas are closer to the style of the first half of the 1950's than to the new economic mechanism.

### Conditions for Finding the Way Out

In respect to finding a way out, Andras Hegedus' ideas need amending and expanding rather than debate. I fully agree with the essence of Andras Hegedus' proposals, with the exception of the one aimed at "social control independent of lobbies," for this formulation and the recommended solution would not result in increasing social control but would lead to an increase in conflict situations and bureaucracy. I agree with Andras Hegedus' ideas but regard them as insufficient. Therefore, I would like to outline with several ideas those goals which I regard, on the basis of my research, as compatible with economic reform and enterprise interests which should be followed and are realizable.

1. From the theoretical and practical point of view alike it is unjustified to speak of large enterprises as a separate group in regard to their relationship to the reform. The concept of a large enterprise covers different sizes in the various structures of society, science and practice. Moreover, the relationship to reform depends not on dimensions, but on the effects of the reform. It is an indisputable fact that with the introduction of the new economic mechanism, most of the enterprises and particularly the large enterprises revived. It was the objective situation of the enterprises that put an end to the revival: the fact that their legal obligations were not reduced while their economic possibilities were narrowed, particularly in the area of applying entrepreneurial freedom and the use of manpower. This process began on the first day that the reform was introduced. But the warnings that were sounded in this regard passed unnoticed.
2. Growth is an objective process existing and being realized both in society and the economy. It is impossible to explain efforts at increasing the size of enterprises by the subjective intention of enterprise managers, particularly managers of large enterprises. The opposite is true (and not only in a socialist economy): the smaller an enterprise or business the greater is its desire for growth. On the other hand the experiences of the capitalist and socialist economies bear witness that above a certain size the enterprises strive for research, development, or to gain and maintain markets rather than to increase their own size. Independently of this, we must regard enterprise size categories (small, medium and large) as the temporary grouping of mobile undertakings that change dynamically in contradictory directions. These are groupings which are taken into account by statistics, economic policy and social policy, not in order to limit the area of mobility for certain categories but to promote maximum development in every category. This is impossible on the basis agreed upon by both the antireformists and the proreformists: namely, that certain size categories should be placed in an advantageous position and others in a disadvantageous one. This attitude can in no way be regarded as scientific. Because of this outlook, a permanent sense of uncertainty is developing in the economy. In the final analysis, it is not how big an enterprise is that is important but how much profit comes from a unit of invested means for society and the enterprise workers. This is not weighed, however, either by those who favor small enterprises or those who favor big ones. But we need in the national

economy a mechanism which does not tolerate, in any kind of category, income this is socially unprofitable or is based on more work than is socially necessary, on waste, a low degree of productivity and conditions which destroy work morale, making it possible for higher wages to be paid in one sector than in another for the same or lower achievement.

3. The reform must be unambiguous, (in time and space) clearly defined and affording perspectives. In this regard, there can be un unexpressed or unexpressible goals and intentions. This is the condition for society and particularly its organizational structures to support the reform. The reform of the socialist economy cannot have any goal other than making it more effective, and bringing it nearer to developed socialism. In this area, the Hungarian economic reform encountered difficulties which do not derive primarily from the original measures of the party and government but from informal efforts and the effects of the changes in the world economy.

However this may be, we must reckon with its factor, be active and step in this direction.

4. Only an economic reform and development intention which is built on the natural and patterned processes of the economy can count on success. The economic patterns and processes are developed or carried through in ideology and politics, and not in the system of state administration but in the basic structures of the economy, in the enterprises, cooperatives and socialist entrepreneurship. It is a great mistake to believe that over the long run these undertakings "may behave" in a way that is against their own interests. If we learn, however, that processes are being realized which are antithetical to certain basic ideas or not proceeding in the same direction, we must not look for the causes primarily in the basic units, but it would be worthwhile to study whether our intentions and goals are unrealistic and contradictory to what is needed. It would be a great danger if a view began to prevail which looks for every fault in the enterprise sphere and ascribes every success to structures outside the enterprise. Unfortunately, we are witnessing the development of such an outlook.

5. Equal conditions are needed for all enterprises in the socialist economy. In this area, the standard of judgment cannot be the number of persons employed in the enterprises, or the value of their fixed assets, but exclusively their economic contribution to the maintenance and development of the society. In this respect we cannot permit a philosophy of "one goose=one horse" but only the rule of 1 forint=1 forint." Unfortunately this is not being realized now, particularly not in respect to large enterprises. Within one economy we cannot permit a soft and a hard currency, development and maintenance currency, material and wage-cost currency, private enterprise and state-enterprise currency, and so forth. These are irregular and exceptional situations, and not the permanent accompaniments of a socialist economy. We must move urgently in this regard. All the more so because a delayed step is not a step forward but a step toward new cares and problems.

6. In respect to the orientation of public opinion, we can agree with Andras Hegedus that "we should radically put an end to the manipulated orientation of public opinion" and not only in regard to the activities of large enterprises but also undertakings, and in fact in general. It appears everyone reads and hears what he wants to. Otherwise, it is difficult to explain why, according to many of us, we read all the more from the writings of nonauthoritative outsiders who in their lack of knowledge about the facts frequently tailor a suit of clothes for an enterprise without prior information about the size. Perhaps no one will dispute that in the past 2 or 3 years a work distribution has developed in which the showing of entrepreneurship in a significant portion of the mass media occurred in such a way that generally the large enterprises and the socialist entrepreneurship were criticized, and too much space was devoted to the popularization of small entrepreneurship, including small, private ones. How much this has gained vogue is proved by the fact that at its April 1983 session the MSZMP Central Committee had to deal specially with this matter.

7. We need a long-term economic-political strategy which is built on factors that are permanently being realized and have a permanent effect, but at the same time create and assure an appropriate area of mobility for both guidance and enterprise practice. A great role is played in this by the fact that we should consistently realize the principle of distribution according to work not only in respect to individuals but also enterprises! Violation of this principle cannot be permitted even temporarily during the building of socialism. Only that enterprise is able to pay its workers according to their work which itself (within the national economy) shares in the produced goods according to its work. This is realized only to a small extent in the enterprise structure of Hungary. But this has an effect on the whole of employment policy, work morale and, not least of all, on enterprise size structure because that enterprise develops and expands capacity and personnel which has created the sources for it and not the one that has "received" such sources. We can move into the desired situation if we put equal requirements, in the area of accounting and income withholding, on enterprises of every size and in every sector, the conditions of which are the same state administrative constraints, the same statistical and data processing obligations and the same strictness in external control and accountability.

8. Enterprise autonomy is not only an economic but also an organizational and operational category. This refers to every entrepreneurship. Primarily in the case of state enterprises, and particularly large enterprises, we do not allow this perception--which is several decades old--to be realized. Autonomy extends primarily to the internal enterprise order, organization, technology, and that portion of the new value produced by the enterprise collective which remains with the enterprise. In this area the sociopolitical factors have an increased role. Only on an optional basis can social policy also represent an enterprise function. We have not only failed to realize these principles but we have not even recognized them, and this evokes serious distortions and problems among and within our enterprises.

9. It is a condition of reform success and development that economic management should bring everyone to create order in this "own" house, and that no one should be in a situation where he is living at someone else's expense, particularly someone else's work. We cannot expect only the socialist enterprises to assure such a situation, or particularly not the managers of large enterprises, since they have been tied down by their "own" problems to an excessive degree. They do not deserve reproach because they have solved their problems through "more and more annexations." What is more natural than affiliation and association if this results in gains for the partners, and what is more natural than separation (division) if this results in gains for the dissolving parties? We should not condemn annexation, amalgamations, separations and withdrawals in general but only take exception to those from which no one enjoys benefits, or which in the final analysis are harmful. At any rate, it is not proper for outsiders to give advice to enterprise managers on how they can solve their problems. The only criterion here is whether in solving their problems the enterprise manager observed the written laws and expectations regarding social tranquility, development, or a general increase in satisfaction. These are all concrete matters.

The continuation of the new economic mechanism and the overcoming of difficulties is conceivable if we debate not who is individually or collectively responsible and why (although I would not shut myself off from this) but if we devote our attention and strength to developing a new economic mechanism in which the enterprises--as the basic cells of the economy--and also the collectives and managers of the cooperatives will feel that society continues to need them, that they can gain success through work within the enterprise, and not in confrontation with their enterprises or with outside "entrepreneurships." Such a reform outlook would realize great energies as a consequence of which the volume of material goods would increase and their quality improve. After these things, we would need to talk less about the new economic mechanism and more about everyday problems, for example, a rise in living standards and the ratios of development. But to do this, we must recognize that we are speaking of the decisive elements of the economic mechanism when we speak of socialist enterprises or large enterprises. These, in fact, represent the economy of a country and their work represents wealth, not some kind of entrepreneurial or other structure standing on, beside, above or outside it.

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HUNGARY

CREDIT POLICY VIEWED: 1983 RESULTS, 1984 TASKS

Budapest PENZUGYI SZEMLE in Hungarian No 3, Mar 84 pp 164-170

[Article: "Our Credit Policy"]

[Text] The main goal of our economic policy this year, too, is the improvement of the foreign and domestic equilibrium and the maintenance and strengthening of our international ability to pay. Despite the drought and the deterioration in the terms of trade, the Hungarian economy last year made significant achievements, and it can be attributed primarily to this fact that our international payments position improved.

Foreign Exchange Situation

The 1983 annual economic plan set as its most important goal the maintenance and further strengthening of the international ability to pay, and the requirements for the payments balance were set accordingly. Thus in the nonruble account relation it counted on an improving foreign exchange situation, and declining debts. For this an increase in the foreign trade balance surplus was needed. In the ruble account relation, the goal was to improve the equilibrium between commodity trade and the current balance of payments.

We achieved the basic goals of the plan. In nonruble commodity trade we had at contractual parity an export surplus of US \$826 million, which was substantially greater than the balance the year before. All this came about despite the fact that the conditions were less favorable than we had counted on. Sales were more difficult on our major markets because of the prolonged recession, and protectionist measures also hit us hard. Moreover, price formations were also unfavorable: The decline of prices measured in dollars was greater in exports than in imports. The severe dryness and drought also contributed to keeping the foreign trade balance surplus below the planned goal.

Our tourist receipts developed favorable; net income was about US \$165 million. Our interest payments were somewhat less than the year before. Our ruble economic relations developed within the planned framework. Here, too, our tourist receipts increased: we had a surplus of about 170 million transferable rubles.

Improvement of the domestic and foreign equilibrium will also be the main goal of the plan in 1984. This will be no less of a task for the economy than it was last year. To further strengthen our international payments ability, we need to reduce the volume of debts. In addition to the probable credit opportunities and the debt servicing obligations that will fall due, we will have to achieve a balance surplus of US \$700 to 800 million in the convertible currency relation under conditions which still leave us the effects of last year's drought while we cannot count on any worthy improvement in our marketing possibilities. In the ruble relation the basic goal is to realize an equilibrium in the balance of payments.

It is very important that import materials and spare parts are available in a timely manner and in the necessary volume, and that they make possible a continuous domestic supply, production and export. To this end, many measures have been taken. It is an important task fully to realize production and distribution goals.

#### Foreign Credit Relations

In 1983 the development of Hungary's international credit relations was characterized by improvement. On the domestic side, this process derived from our economic policy, which of necessity gives continuous priority to the foreign equilibrium, and despite our problems was successful. Among the foreign factors in the consolidation of our international credit relations, our cooperation with banks merits attention. The successes of our economic political efforts have created the basis for our requesting and receiving credits from two international financial institutions of the UN, the IMF and the World Bank or International Reconstruction and Development Bank.

On the basis of a credit agreement in December 1982 we called in about US \$360 million from the IMF. In the first half of 1983 we took US \$200 million in medium-term credit from a bank consortium. In the second half of the year, by virtue of our membership in the World Bank, we were able to obtain US \$270 million in long-term credit from two international bank consortiums in so-called associate financing form. It is of particular importance that the World Bank itself participated in this transaction as a creditor. Thus in 1983 with the fulfillment of our credit obligations we were able to improve our liquidity situation and the international judgement of our ability to pay was improved. An important contribution to the realization of our credit plans for this year is the fact that the IMF approved on 13 January a new stand-by credit in support of our efforts at equilibrium improvement for a total of SDR [Special Drawing Rights] 425 million (about US \$425 million). Interest payments and the expiration term are more favorable than for credits obtainable from commercial banks. The following new developments may be expected this year in our relations with international financial organizations and in our exchange rate policy:  
--We are planning on taking loans this year also from the World Bank for the realization of our economic political goals, the expansion of our convertible export goods, and in regard to the hydrocarbon program. A repeat of associate financing organized with the participation of the World Bank and commercial banks also has a role in our thinking.

--Also linked to our participation in the World Bank is the fact that under the name of "Bank-Inform" the Hungarian National Bank will introduce a new computerized service in the framework of which--for modest payment--enterprises would receive information coming in from all facilities being financed by the World Bank which are linked to certain phases of the loan grants and may prove useful to the Hungarian enterprises which participate in the system in order to prepare successfully for negotiations. By exploiting these advantages we can help in the realization of our plans by linking into new export markets.

--We wish to expand our relations also with commercial banks.

--The exchange rate policy in 1984, too, must promote the development of financial processes laid down in the plan. In case of changes in foreign or domestic conditions, it must adjust with appropriate flexibility to the new conditions--as is true of other elements in the regulatory system.

#### Credit Policy in 1984

The goals of our economic policy are served by the principles and requirements which were developed with the Sixth Five-Year Plan, and thus there will be no opportunity for changes in 1984. The interests linked to keeping investment activity and working capital credits within the limits of the plan will make it necessary to continue observing strict credit practices. Several significant steps were taken in 1983--planned in part for 1984--for the modification of credit policy guidelines. On 1 July 1983 we realized the unification of interest rates. In this framework there was a reduction of 1 percentage point in rates for short-term credits, discount rates were eliminated, and the conditions for making enterprise deposits were modified. At the center of investment credit loans is continuing support for developments that promote the equilibrium of the foreign economy, thus primarily export growth, economic import substitution, and the reduction of material and energy consumption by the economy. It is an important interest of ours to use to the extent possible through appropriately prepared development programs the credit possibilities made available by international financial institutions. To this end the bank will provide domestic credit possibilities in a timely way and to the necessary extent. The announced conditions for investment credit--maturation and profitability requirements--will not be changed in 1984, but in the granting of credits the bank will strive to see that it is primarily those smaller, auxiliary developments which receive credit where the prospective profitability is high and where an adequate ratio of external resources will make repayment possible in the shortest time.

The credit budget available for enterprise investment goals--similar to 1983--is 22 billion forints, and the credit volume may rise by 1 billion forints. Tensions are evident between credit negotiations possibilities and obligation undertakings as well as the credit demands well known to the bank. To expand credit possibilities, the bank in following its practice thus far will examine the investment credit contracts at year's beginning. In the case of investments where fulfillment of the indexes agreed to in the contract cannot be expected, the credit grant may be withdrawn, rescheduled, or the remaining amount revoked. In cooperation with the enterprises and the guiding organs, the bank will urge

this year also a more rapid repayment of the credit by enterprises whose financial situation makes this possible.

In 1984 further steps were taken in the development of the interest mechanism: a more flexible interest system was introduced in which credit interest guided by bank of issue (deposit!) interest rates will be realized. The extent of these interest rates will be determined by the combined sums of the prevailing bank of issue interest rates and the interest margins stipulated in the contracts.

On the basis of the free determination of the economic organizations, the bank of issue interest rate at present is the interest for long-term--1 or 2 years--deposits. Accordingly the interest rate for bank credits will be made independently of the economic goal for credits as of 1 January 1984:

--in case of short-term credits, the interest rate on 1-year deposits (9 percent) and the interest margin of 4 percent amount to a combined 13 percent, and

--in case of medium and long-term credits, the interest rate on 2-year deposits (annually 11 percent) and the interest margin of 3 percent amounts to a combined 14 percent.

The bank examines the bank of issue interest rates at least twice a year and may modify them if necessary, the interest margin remains unchanged for the term of the contract.

The principles of working capital credit will not be modified in 1984. In the support of efforts at improving inventory management--by producer means or foreign trade enterprises which take over from the enterprises superfluous inventories for use or sale--there will be opportunity for obtaining credits that may be repaid without using the development fund (from income).

In issuing working capital credits, the bank will continue to seek stimulating an improvement in the level of enterprise management by means of strict credit practices, and to strengthen financial discipline and collect payments outstanding.

In order to promote an increased regulatory role for credits and develop more flexible market reactions, the bank will work out in 1984 a system of commercial credit grants and principles of refinancing, and will make recommendations for their introduction.

#### Modernization of the Bank System

In relation to the transformation of the institutional system of economic guidance, the question has also risen of the further development of the financial institution system.

The thinking is aimed at reduction of central intervention, and an increase in enterprise independence through the role of the market or competition. We must strengthen the function of the bank of issue and improve bank business activity.

In developing the regulatory means of the bank of issue, money and credit policy ideas must be brought in harmony with other requirements deriving from the regulatory system in such a way that they will not neutralize each other's effect. Credit regulatory activity must be developed by considering the relationship between issuable credits and accumulable deposits. We must increase the role of interest policy in influencing economic life. The interests should adjust flexibly to changing conditions.

In credit work we must intensify the realization of efficiency, conversion and profitability points of view.

Various types of small organizations performing banking activities have been established in recent years. Ideas have been advanced for expanding banking activity. We support their realization. It is also necessary that bank of issue guidance and control should extend--as to other banking institutions--to the new institutions.

#### Credits for Expanding Convertible Export Goods

To the end of 1983 during the Sixth Five-Year Plan period the Hungarian National Bank extended 28.5 billion forints' worth of credit, including 8.2 billion forints in 1983, for the expansion of convertible account goods. More than one-half of this was used by industry, but the small and large operations of the food industry also shared in these credits to a significant extent.

The chemical industry has been the greatest user of industrial credits in this plan period: the most important investment in this plan cycle for the expansion of convertible account export goods is being realized at the Danube Petroleum Enterprise with the catalytic cracking plant, for the financing of which the bank is extending 6.1 billion forints of credit.

Suffering the most from the world market recession, the metallurgy and machine industry's interest in export development credits has declined as compared to the previous plan period. Credits granted were for investments already underway (Hungarian Coach and Machine Factory, Hungarian Ship and Crane Factory, IKARUS, and Danube Iron Works).

Eighty percent of the investments being implemented in the food economy are for the improvement of fixed asset facilities in agriculture. These investments are primarily for the mechanization of crop production on arable land.

As a result of export development investments in 1983 we have realized according to preliminary data, exports to the value of US \$1.1 billion, somewhat less than had been promised. This was contributed to be the decline in world market prices (prices in 1983 for our convertible account exports were about 10 percent below what they were the year before), volume limits on sales, and also by internal problems such as technical and quality defects. The greatest lag occurred in metallurgy and the machine industry.

The food economy fulfilled the obligations undertaken (for 1983) in the credit contracts, but because of the drought large agricultural farms showed for the first time this year a bit of lag in their fulfillment.

In 1984 a total of 7.4 billion forints' worth of credit is available for investment to expand the convertible exports goods base. Almost one-half is to finance investments for which we are using World Bank credits, thus for the grain program begun in 1983, loans for which may be obtained on the basis of special application from large agricultural farms.

Also with the use of World Bank credits we are preparing to put together a credit program for industrial (including the food industry) export expansion and structural transformation. The bank has already granted the forint credits for a number of such investments (for example, at the Vac Knitwear Factory, the Magyarovar Knitwear Factory, the Western Hungary Lumber Combine, and the Szeged Salami Factory).

Other convertible account credits will serve primarily to implement investments already underway. Only modest possibilities exist for the financing of new investments.

The conditions for export expansion credits remain the same, but the bank wishes now to pay greater attention to enterprises which have demonstrated good results on foreign markets and have continuously produced for export in a high ratio (about 25 percent).

#### Energy Rationalization

To the end of 1983 in the Sixth Five-Year Plan period, the bank granted 349 loans for energy rationalization in industry and the food industry, or a total of 12 billion 74 million forints. As a result of the rationalization and modernization --including savings attainable with basic industry production expansion investments--the expected planned energy savings are very significant. In 1983 we granted 3 billion forints' worth of credit for 127 investments. The most important investment was the credit granted for the viscosity breaking plant of the OKGT's [National Oil and Gas Industry Trust] Danube Petroleum Enterprise. The primary goal of the plant is to produce light heating oil from heavy heating oils, which would mean the savings of a great volume of petroleum. Another important investment was credit for the establishment of a new coal dressing plant at the Oroszlany Coal Mines. With its delivery, the so-called quality brown coal (which meets the population's demands) can be almost doubled.

It is expected that the bank will grant 3.3 billion forints' worth of credits in 1984 for energy rationalization investments. We regard it as an important task of ours to control investments underway more intensively in order to assure that energy savings will be gained as soon as possible.

#### Economic Material Consumption

In 1984 also it will be an important national economic interest successfully to carry out the government program for economic material consumption and technological modernization. This year's economic plan is counting on our achieving a part of the increase in the national income through the more economic management of materials (including energy and waste).

In response to the 1982 invitation for applications regarding the carrying out of the government program, 19 applications were submitted as of the end of last

year by industrial enterprises. Thirteen of the credit requests met the requirements, and the total credits authorized for these requests exceeds 950 million forints, but only a small part of this was used last year by the enterprises.

This year 300 million forints are available for the goals of the government program in economic material consumption and technological modernization. It is important that the investments to be realized from this sum should be repaid within a short time.

The results of the waste and used raw material utilization program are encouraging: with the increase in enterprise savings and the widening of material-saving technologies, waste formation has been reduced.

The bank has extended loans to 33 enterprises for a total of 4.6 billion forints to finance investments serving the goals of the program. From these loans--and from internal sources--39 investments are being realized. The most important are:

--investment for the slag processing plant of the Ozd Metallurgical Works, and for a similar slag tip at the Danube Iron Works;

--developments being implemented at the MEH [Trash and Garbage Collection Trust] enterprises (for the processing of iron, paper, nonferrous metal waste, cable and pipe waste);

--an investment of the Joint Metallurgical Basic Material Dressing Enterprise to provide waste input [hulladek betet] for the converter and electric-steel works.

Among the investments financed with credit between 1981-1983--at a total cost of 2.3 billion forints--20 have been completed. The planned capacities--with the planned content and cost requirements--have been built. At present 9 new investments are in process, and their completion is planned by 1984-1985.

For 1983 the food industry undertook an export increase of US \$75 million in capitalist import savings. Despite the efforts to counter the decline of the commodity base because of the drought, the overall plan was not realized, the shortage was 10 to 15 percent. Within this, however, investments realized with convertible credit fulfilled, according to preliminary data, the dollar income agreed to in the contract.

Last year the economic organs turned to the bank for about 1.5 billion forints' worth of credit requests in convertible currency; their efforts were directed at creating the conditions necessary for remaining on the market. The 1984 credit policy guidelines also make it possible to support such goals with credit. The most important task of agriculture this year is to realize about a 4 to 5 percent increase in production by means of more efficient work. It is important that the competitiveness of agricultural production should improve, and that commodity production should develop according to requirements.

The implementation of the task will be more difficult this year. Most of the credits granted by the bank in the second half of last year were for producer

cooperatives and state farms in six drought afflicted megyes--Szolnok, Hajdu-Bihar, Bacs-Kiskun, Csongrad, Pest and Bekes. We must reckon with the consequences of drought damage this year also. Therefore in granting development credits during these years we are devoting special attention to the financing of developments at operations which were otherwise efficient and had outstanding results for many years but ran into troubles last year because of the drought.

It is a special task of ours to fulfill the grain production and storage program. About 40 percent of the more than US \$300 million program to be implemented in 2 to 3 years is financed with World Bank credits. Other programs are also being worked on which are directed at a growth in live-stock breeding and meat production, and at increased food processing. We will continue to devote great attention in the field of agricultural production to production on household and auxiliary farms, or their support.

#### Innovation Fund

At the initiative of the bank, the Innovation Fund was established in 1980. Its task is the financing of the development of Hungarian intellectual products as marketable goods or services on a risk-undertaking basis. Of the 600 million forints' worth of approved capital, the Fund granted 370 million forints' worth by the end of 1983, of which about 100 million forints have already been repaid. As the mediated result of activity by the Innovation Fund many new products have appeared on Hungarian markets, and various new agricultural and industrial technological experiments have been tried out or introduced.

#### Entrepreneurial Fund

In relation to the process of modernizing the institutional finance system, the Hungarian National Bank established the Entrepreneurial Fund in 1983. The goal of doing so was to help in the financing of tasks to supplement traditional credit activity (to increase its effectiveness in some cases) and to promote resource regrouping on the basis of profitability. Thus above all, it provides economic organizations access to permanent financial sources; availability of capital necessary for the founding and operation of newly formed economic associations and companies; the adaptation and broadening of new financing forms (Lizing, bonds); and the extension of financial services linked to all these matters. The financing is not limited by sector, sub-branch or other obligations, the basic requirement for a business is high profitability.

The issue of money by the Entrepreneurial Fund is determined within the framework of development and credit policy requirements by business points of view (profitability, conversion, and risk). In harmony with this, the money issued by the Fund helped realize in 1983 a series of profitable businesses that give rapid returns. By using the Fund in 1983, enterprises and cooperatives signed contracts for a total of 325 million forints. Without trying to be complete, let us mention that with a 100 million forint participation by the Fund a company was formed to develop services related to private housing: its task was to loan to the population construction machinery through the development of a national store network. In the framework of another business we granted 33 million forints to finance the shooting of a foreign film in Hungary on a contract basis. With the

granting of a 14 million forint loan, the Fund supported the creation of conditions necessary to meet more rapidly consumer demand for modern furniture, and the publication of rare books with a loan of 30 million forints.

As a function of the demands as they arise, the bank is planning an increase in the priority of business financing (by way of bond issues) and the further quality development of the activity (security trading).

6691  
CSO: 2500/292

HUNGARY

DEVELOPMENT OF COMPETITIVE PRICE SYSTEM DISCUSSED

Budapest FIGYEL0 in Hungarian No 10, 8 Mar 84 pp 1, 4

[Interview with Dr Laszlo Racz, main department head of OAH [National Price Office], by Dr Gyorgy Varga: "The First Ten;" for more on this see JPRS 84912 dated 9 Dec 83 pp 61-67 and JPRS EEI-84023 dated 22 Feb 84 in this series]

[Text] "Price Club"

The National Material and Price Office published an announcement for competitive bids for exemption from the administrative restrictions in following the export price and profit levels in setting the processing industry's prices. (FIGYEL0 No 44, 1983 and No 1, 1984). The purpose of the competition is to gradually develop a price system suitable for the requirements of the market's competitive prcies.

An interportfolio commission was set up to judge the competitive entries, and it has made decisions about the fate of the first 13 entries. The commission has approved the application of 10 enterprises and cooperatives, decision about the applications of 2 enterprises is pending and the commission has sent back the apllication of 1 enterprise for additional information.

The enterprises which have won exemption are the following:

Machine Tool Factory of the Csepel Works  
Danuvia Tool and Equipment Factory  
Debrecen Shoe Factory  
Forte Photochemicals Industry  
Gyor Knot Glove Factory  
Refrigeration Technology Cooperative  
Pannonia Fur Preparation Enterprise  
Rabatest  
Szarvas Iron and Metal Industry Cooperative  
Red October Mens Clothing Factory

Dr Gyorgy Varga asked Dr Laszlo Racz, head of the OAH's main department, about the initial experiences.

[Question] While a relatively large number of enterprises intended to participate in the experimental income regulation, why is it that so far only a few enterprises have applied for exemption from the administrative regulations of the processing industry's rearrangement?

[Answer] The reason for this, first of all, is that there was a deadline for submitting the applications of enterprises. However, the enterprise may submit an application at any time, if it feels it can satisfy the conditions of the application. There is an annual check of competitive price development and enterprises have had time to consider their entries. Further, many enterprises expect the experimental wage regulation to strengthen their material interests and the possibility to more dynamically increase their wage levels. Application of the market price policy has no such direct and immediate effect. Rather this offers advantages to those who expand their exports in the future and who expect fluctuations in the foreign market prices and export volumes. Thus, one must here think also in terms of the longer range. I see these as the main reasons.

Of course, there are also other reasons. In order for an enterprise to request exemption from the administrative regulations of competitive pricing, it has to perform rather careful calculations. Since interest in ruble-accounted exports has been tied to the periodic profitability of the domestic base, the enterprise can also lose on the deal if its 1984 domestic profitability improves in comparison to that of 1983. That is, what is involved here is that the enterprise which is granted exemption from the rules of the processing industry's price formation is allowed to account for its financial bridges tied to its socialist export on the basis of its previous year's domestic profitability, even though the enterprise's domestic profitability improves in the subject year. Several major enterprises have performed such calculations and showed that under the given rules of the game, the "exemption" for them would result in large losses of income.

[Question] Could this not be seen in advance?

[Answer] Yes, it could. But the truth is that the enterprise does not yet really see the advantages resulting from conducting the market price policy. The fact is that for those enterprises which today have good export prices and good export profitability--the removal of administrative price regulations does not represent any additional advantage because even with these they come out all right. And today they are still influenced by these immediate interests.

It is an unquestionable advantage of the introduction of the much criticized competitive price system that in reality the enterprises have begun to analyze international prices, their costs and the competitive advantages and disadvantages as of 1980. And this is also reflected in the fact that the enterprises are careful, they do not rush into their decisions or the applications.

[Question] About 30 percent of the enterprises admitted into the "price club" are also participating in the experimental wage regulation. Have any concerns or considerations surfaced in connection with the acceptance of the dual applications?

[Answer] Yes, specifically by the ABMH [State Wage and Labor Affairs Office], the fact that we grant exemption from the administrative regulations of the processing industrial pricing to enterprises participating in the experimental wage regulation only if the enterprise has a proven solid policy, because in the opposite case the extent of the wages paid out could exceed the extent of the increase in performance. However, of course price regulation cannot be separated from market conditions. If the value of the product increases on the international market, the value of the work which produces it must also be recognized as having increased.

[Question] What characterizes the first applications?

[Answer] Those enterprises which had their applications considered favorably had conducted in previous years and indicated for 1984 price policies which provided the necessary proof for the commission. There were enterprises which even before held their domestic prices below export prices and pledged to continue to do so in the future. For these, dissolution of the administrative restrictions means more of an assurance for the more distant future. I will observe here that the commission does not consider this "pledge" to be a condition for exemption, but merely calls the enterprise's attention to consulting with the Price Office if significant changes occur or are expected in the relationship of the domestic and foreign prices described in the application. It is characteristic for practically every applicant that they bring their pricing policies into a relationship with the market conditions and do not follow cost-price automatism.

There were also some enterprises which for several years had not increased their price levels and are now planning major price increases. Taking this also into consideration, we accepted the applications in those cases where, even in spite of the planned price increases or, if including this, their prices are not excessive when compared with international standards.

Practically all enterprises are characterized by a significant proportion of convertibly accounted exports: For many of them it exceeds one-half of their total sales and the average export proportion of the affected enterprises approximates 35 percent. In the given situation this also qualifies the enterprise's market situation. In their applications, the enterprises pledge to preserve and in some cases significantly increase the level of convertible exports they have achieved, also taking into consideration that by means of the exemption from the export price level and the profitability requirements they will also be able to undertake more courageously than before exports which involve temporary price sacrifices.

All affected enterprises have indicated that they will fully meet their contractual export obligations to the socialist countries.

[Question] One basic condition for exemption from the pricing limitations is that balanced supply and demand conditions must prevail on the market of the products of the applying enterprise. On the basis of what criteria can this be judged, and is there some kind of objective standard or qualification system for this?

[Answer] In some obvious cases when the applicant is not in a monopoly situation, and there is also a reserve capacity, the decision is simpler to make. But in many cases it is difficult to judge the market situations of the applicant's products. For example, the Forte is in a monopoly position in film production. On this basis its application should have been rejected. It was found, however, that its products have great price flexibility, that is, above a certain price level its customers decrease their purchases. Thus demand exerts an active effect on monopoly producers and their pricing policies. On this basis, we judged that the Forte meets the application conditions.

[Question] That is, the organization's monopoly in itself is not a reason for exclusion as long as market- and price-sensitive products are involved. It is possible, however, that while in the given specific field the enterprise is not in a monopoly position, but it is the sole producer of the product it produces. There is no organizational monopoly but there is production monopoly.

[Answer] The situation is really not simple. I think we often exaggerate the monopoly position. There are situations where the monopoly producer has a monopoly customer for a domestic partner. And in some other cases the enterprise is in competition for its own profits, when--as you mentioned before--price-sensitive products are involved. Also, often the competition by cooperatives, council-managed and small-scale producers is underestimated. It often happens that commerce has price problems not with those producers which are alone on the market but with those which even together cannot meet the demand.

I am not denying, of course, that subjective factors also play a role in judging market conditions. This is also a reason for having representatives of the supervisory organs of the purchasing organizations in the commission. I will observe here that the applications of the two enterprises mentioned in the introduction also became debatable primarily because the market situation of their products could not be unambiguously judged in the commission.

[Question] According to the announced conditions, the applicants must accept the obligation not to exceed the potential import price with its prices. How can this potential import price be documented when there is no actual import of the given products, or if at the most this price is only an offer price?

[Answer] That's a good question. Specification of exceeding the potential import price as a condition only served the purpose that those who produce near the import price level increased by customs duty, should not be looking to solve their problems by this means. That is, authorization to implement the market price principle can easily lead to laxities there. But so far no enterprises whose acceptance of the import price limit would cause difficulties have applied. And I do not even consider it likely that any such enterprises would apply in the future.

[Question] It is noteworthy that medium-sized enterprises are in the majority among the first enterprises to be granted exemption from the administrative regulations.

[Answer] This is the fact and they are also in the majority among the other applicants, even though we are primarily encouraging large enterprises. This also proves that this circle will not become some kind of a closed "club" of the elite of the major enterprises.

[Question] What is the expectation: at what rate can the circle of enterprises operating in the market price system be expanded?

[Answer] We expect that in 1984 presumably in the first half of the year, enterprises representing 25-30 percent of the processing industry's output will have their admission applications approved. For example, applications from 15 additional enterprises are now coming up for evaluation. We think that in 1985 enterprises which produce more than half of the processing industry's output will be able to operate in the pricing system without price limitations, and in 1986 only the poorly operating enterprises will remain outside the circle.

This application system, even if possibly some modification may be needed on the conditions, can gradually lead the processing industry over to the competitive market price system. It is desirable that in the transitional period the enterprises which export and perform import replacements should apply in as large numbers as possible, because these feel directly the real or potential effect of foreign market competition. Further, in order for us to also provide the opportunity for rational enterprise policies to all those which are ripe for convertible export and plan to intensify their foreign market connections only in the future. This will develop an enterprise behavior which--even without the specification of export price limitations--will prevent sliding back into the circumstances of Autarkic price forming.

8584  
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HUNGARY

BUREAU ESTABLISHED FOR MAKING LOANS TO ENTERPRENEURS

Budapest FIGYEL0 in Hungarian No 10, 8 Mar 84 p 12

[Article by Breitner: "Business Bank; Using the People's Money"]

[Text] We are living in the epoch of small steps. We have to consider as such a small step that the OTP [National Savings Bank], authorized by the Minister of Finance, established a Bureau for Entrepreneurs. The style of the bureau should not startle anybody. Maybe we can register the establishment of a bank to operate later in a business form, that perhaps will secede from the OTP and become its subsidiary company. As of now, however, referring to small steps, the statutory provisions do not yet offer the possibility for this.

Neither can it be known how large a clientele the bureau established in February might have. It is far more essential that it is operating in an entirely independent accounting system--in contrast to the OTP as a whole--that is, in a profit-oriented manner. On the basis of the paid-in capital of the bureau, the OTP will receive 20 percent from the profits earned. Taxes would account for 30 percent, however, a 2-year tax allowance applies to this at present. The 50 percent balance will be used to build up the funding base of the bureau to establish a development fund, and to create a framework to be used for granting service bonuses. The latter represents a novelty in our current banking system, and it should not be mistaken for example, for the sliding scale of wages also practiced at the OTP and paid at branch offices. The employees of the bureau thus unambiguously will be able to increase their earnings only if they can produce the required profits. Undoubtedly, this would change their bankers' attitude away from the habitual and toward a positive direction.

The scope of functions already might set in motion the imagination of those who would be interested. Beside striving after profits, what kind of requirements could we claim from a business bank? It should assist managers who need funds, should undertake risks, should accumulate financial resources and pump them back into the blood circulation of economic life. The ability of the currently operating banks to grant credits--partially on account of restrictive provisions--is limited. Desirable are those additional solutions that would promote technological development, would improve innovative skills and provide funds for projects where their refunding looks assured. To achieve these objectives, the additional financial source could be the

people, and not deposit savings. For the time being, the OTP sends off this enterprises with a paid-in capital of 300 million forints.

The tasks of the Bureau for Entrepreneurs are the following: providing credit to individual and joint private entrepreneurs, investment of capital in similar organizations, and in undertakings established jointly with state enterprise, that is, with cooperatives. Added to these are also cases concerning innovations, securities, leasings, (factoring). Let us review what we might expect of each of these activities.

It is a frequently voiced argument that the reason why small production companies have been formed only in trifling numbers is, beside inadequate confidence, their lack of capital funds. Although it is true that the OTP since 1982 has been granting credit even in sums of millions of forints so small craftsmen and shopkeepers and agricultural cooperatives, they are still inadequate. (According to our information, such credits bearing interest at 11-12 percent per annum are used rather for providing working capital, (factoring) accounts receivable than for production investments.) In the case of such credits--as well as in the case of the credits to be granted in accordance with the new entrepreneurial manner--the guarantee would be provided by movable, i.e., chattel assets (transferrable recreational house, recreational lot, jewelry, entrepreneurial contract, accounts receivable based on contract, life insurance issued to guarantee loans, etc). In an earlier article of ours (FIGYELO No 6 82) we had proposed to grant mortgage credits involving transferrable real estate, precisely for the sake of improving the credit availability of the small entrepreneurs, nevertheless, the Minister of Finance does not allow it even today.

The Bureau for Entrepreneurs will issue its loans at 14 percent interest per annum for a term longer than 1 year; should the term be shorter than 1 year, the annual interest rate will be 13 percent. The amounts of the credits, their terms and the extents of the internal resources will be freely established based on individual agreements reached with the particular clients and depending on the degree of profitability of the respective enterprises.

In the case of investments of funds, joint investments, the essence of the transaction is in the proceeds of invested capital, should it exceed the yield from the interest charged for the loan, than the Bureau for Entrepreneurs becomes a partner in the transaction.

The security transactions that, for the time being, are still in a planning stage, will undoubtedly stir up disputes. The intention is to make it possible for the public to buy in exchange for investment certificates, special debentures or other securities through the Bureau for Entrepreneurs such debentures, securities that now only the management organizations may underwrite. In this manner, the buyers' market for bonds and debentures will increase, and through such securities those management organizations wishing to avail themselves of development funds--provided they have proper plans--may count more surely on the success of their issues. It will not be the owner of the money who decides which security and how much he will buy, but the bureau. However, the interest income that could be acquired in this

manner, may perhaps be larger than that of the public securities. We should not be prudish, the experts know just as well as the people on the streets do that there is a black market, on which the interest rate is considerably higher than the legal rate. Should the domestic banking system restrict the black market--in an engaging and legal manner--by economic measures, that should, over and above its social impact, also help the regulating of the economy. The more so, because as an additional source--money moving just like a hidden creed--the savings of the public could be taken into consideration, and could and should be mobilized.

Please allow me to digress for a moment. The intention is not simply to mobilize existing savings, but also to stimulate an advantageous change in the structure of social consumption. In certain capitalist countries--including among them the FRG, but above all Japan--the saving ratio of the population's earnings is considerably higher than in the socialist countries. Of course, it is true the earnings are proportionately higher, as are the supplies of commodities and services. The clue to the "puzzle": the investment possibilities for accruing incomes and protection against inflation. The consumer has to consider at each of his decisions whether he should spend all of his earnings or he should save some in one of the inviting forms. How important a factor it is in the national economy, was verified by a draft for tax reform published in the September 1983 issue of the ECONOMIST, which would exempt saved income from taxation. Since in Hungary, in the case of higher income earners one can see--at least on our own domestic scale--prodigal consumption, it is in the interest of the people's economy to have any such forms of investments offering judicious alternatives for such earnings that might be originated in the future. (By the way, this would boost workers' material interest, and would also strengthen social and work morale.)

Coming back to the planned activities of the bureau, it will also include "leasing." It is not worth spending much time on this topic, but lately it has again come into "vogue" to use the idiom "rent it rather." It is more worth mentioning "real estate developing." In such a plan, the contracting office would, e.g., finance from its own resources the construction of an office building, and would rent certain lofts and floors to firms of various sizes. Knowing the amounts currently paid by enterprises and cooperatives in Budapest for office, warehousing and workshop space--it does not seem to be a bad deal. (Not to mention that the enterprises are not obliged to charge such amounts to their development funds but are allowed to debit them as expenses.) However, such reasoning can last only until the expense forint would become as hard to get as the development forint. Nevertheless, we can already see signs reflecting this and regulations coming into force by 1985 affecting the earnings of enterprises, regulations which have among their objectives the unification of the "hardness" between the two types of forint.

Lastly, the bureau has received authorization to deal in financing through factoring transactions. In the course of these, it may make advances against the accounts receivable of clients (that is, it can purchase them), simultaneously assuming the risks inherent in such claims, or it will undertake the recording of the claims and their collection. Of course, in case of

advanced and purchased transactions it will pay reduced amounts to the original owners of the accounts receivable.

The fact of how much such banking services are needed can be verified just by small entrepreneurs, who after completion of their contracts with state enterprises frequently are obliged to wait long periods of time for the monies due them. (While it is true that there is some regulation in preparation that would also include small entrepreneurs in the claim collection system, notwithstanding, based on our knowledge of the balance of forces, it would be better for them to have the bank do the collection.)

In sum total, there are not just a few practicable important ideas the realization of which is expected from the Bureau. We will be able to decide only after the passing of some years to what extent the conceptions put forward before the "Business Bank" had been established catch on, what is converted into practicable activities, and what remains a blank bill in the authorization document. For the time being, we can register with delight that the National Savings Bank--through the intermediary of the Bureau for Entrepreneurs--has commenced to put banking methods into practice.

12520  
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SHORTCOMINGS IN FINANCIAL INSTITUTIONS: BUSINESS POLICY VIEWED

Budapest FIGYEL0 in Hungarian No 11, 15 Mar 84 p 3

[Article by Dr Ildiko Cseh: "Business Policies of Financial Institutions"]

[Text] The two largest financial institutions conducting business with the public in Hungary are the OTP [National Savings Bank], and the Allami Biztosito [AB--State Insurance Enterprise]. However, both their business and public relations policies leave much to be desired.

One of the most important functions of the OTP's marketing policy is the introduction of various credit options to the public, so the individual customer can choose the most suitable plan for himself. The name and the credit activity of the OTP have, in the public's opinion, become synonomous. However, the question can be raised, would the OTP's marketing policy be the same in case of real competition?

An important business policy aim of both institutions is to provide customers with not only what they ask for, but also with what they should ask for. To achieve this goal, they prepare and advertise various publications. For example, the 1983 pamphlet about finance and loan qualifications for home construction was very informative, understandable, detailed and illustrated with several options in addition to the introduction of the OTP's seven branches and their business terms. These pamphlets, however, appeared in a limited circulation, and were only available to a fraction of the population. In addition to increased circulation, these publications should also be updated according to changing financial terms.

At present, only verbal information is available at branch offices and this is not as thorough, detailed and specific as written information. Although the contract forms are available--at prior request--they only contain the terms, mainly in financial jargon. There is a need for more information than that, along with some calculations. The wording of the contracts should be more understandable for every strata of the population. To start out, at least those forms and handbills with minimal information, should be the ones to be reprinted first with more significant information. The Customer Service Information, initiated by a few branch offices, has

been successful and should be adopted nationwide. The OTP promotional schemes, such as "thrift month," "world day," etc., will not become effective business policies, without generating customer interest. For the time being, the low volume of shares issued by credit unions and other institutions, does not represent significant competition.

The population does not really have a choice to choose among financial institutions. In certain cases, such as applying for a loan, the customer does not have a choice at all. Even if he had, it would be pointless, since the credit terms are all the same at any branch of the financial institutions. It has been a longstanding complaint of customers that deposits at OTP branch offices cannot be withdrawn from any branch office. It is only possible when, e.g., on some Saturdays the individual customer's branch office happens to be closed, and he is directed to go to another designated branch. The question is, if it is possible then, why can it not be accomplished at any other time?

A similar problem arises in regard to the business hours of OTP branch offices. The business hours coincide with the working hours of most of the customers, who must leave their place of employment in order to do banking.

The complaints of customers cannot be registered at any branch office, due to lack of complaint forms. Thus, customers are compelled to write to the management, to the main audit office, to the legal section of the Chamber of Commerce, or to the media should they have a complaint. There is only one complaint office within the legal section of the main OTP office functioning with minimum personnel unknown to the general public.

The main goal of the AB is the elimination, or at least the reduction, of the "blank spots" in regard to uninsured properties and various locations (e.g., households, plants etc.) The insurance agents are only interested in increased business and not in increased profits. Contrary to popular beliefs, the employees of the insurance company do not receive any incentives should the insurance settlement payable to a client be less than the amount specified in the policy. These beliefs may be suggested by the behavior of some employees. Besides, the insurance agents' activities are regularly audited.

It would be in the interest of some customers if certain insurances could be made available through OTP offices, instead of the inconvenience of completing a separate application at the AB office. The OTP at the present time is reluctant to initiate such change. However, similar agreements with credit unions already have been made.

The dominant factor in the business policy of the AB is the pursuit of its own business interest. It becomes evident in a network of convincing, quick, efficient insurance agents during the sale of new policies. However, in the case of a future claim, the settlement might be a lengthy bureaucratic process.

The advertisements by the AB are mostly propaganda, instead of useful public information. In practice, the terms of a policy are only seen by the customer after signing the contract, information given prior to that by the agent is verbal! Assertive customers occasionally request to see the contract first to study it. (Only if they have time, energy and sufficient background to understand the terminology.) In depth information before signing a contract by customers, should be mandatory.

In this year, the organizational structure of the AB has become "modernized," namely, the branches at the country level have been given more independence. However, we have not received any feedback yet as far as improvements in customer service are concerned. Since every branch, available to the public belongs to the same AB, the healthy, necessary rivalry is lacking even in the case of more independence.

12618  
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ROMANIA

ENERGY PRODUCTION, UTILIZATION DISCUSSED BY EXPERTS

Bucharest ERA SOCIALISTA in Romanian No 1, 10 Jan; No 4, 25 Feb 84

Discussion by N. N. Constantinescu; Eng Ion Maiereanu, director in the Ministry of Electric Power; Eng V. Gh. Scripat-Florescu, director in the Ministry of Mines; Dr Eng Nicolae Armencoiu, director in the Institute for Power Studies and Design; Nicolae Liciu; Dr Aurel Iancu, scientific director in the Institute of Industrial Economics; Prof Dr Docent Eng Vasile Nitu; Eng Alexandru Florescu, scientific secretary of the Central Institute for Energy Studies; Dr Eng Emil Costin; and Eng Marcel Sirbu, deputy general director of the Institute of Scientific Research and Technological Engineering for Automation and Telecommunications/

/No 1, 10 Jan 84 pp 13-20/

Text/ For about a decade energy problems have been concerning all mankind more seriously than ever before. The outbreak of the energy crisis at the beginning of the 1970's caused a veritable worldwide shock, awakening the earth's inhabitants to the bitter truth that fuels and energy are not inexhaustible and consequently cannot be consumed in any fashion but only with the greatest care and an economic spirit.

Romania has also been affected by the world energy crisis, but the party, the state and Nicolae Ceausescu himself saw what was coming before the development of the crisis phenomena in the beginning of the 1970's and took a series of timely measures to prevent and mitigate their bad effects as far as possible. The 12th Party Congress and the National Party Conference as well as recent meetings of the higher party, state and public authorities ratified highly significant and all-inclusive documents for the best and prompt solution of the problem of securing the energy resources needed for the further steady progress of the economy and of Romanian society as a whole. The provisions of these program documents are now being implemented with heavy material, financial and manpower outlays for the purpose.

Of course the massive expansion of the nation's energy reserves also requires investigations, studies and analyses in order to determine, in all cases and according to the party guidelines, the most efficient ways of achieving the main strategic objective of Romania's energy independence as soon as possible.

With this in mind, the editors of ERA SOCIALISTA asked some specialists in various fields to express their thoughts and opinions on the subject. We publish their contributions to the discussion as follows.

#### Energy Conservation As a National Problem

N. N. CONSTANTINESCU: It is an elementary truth that any output requires energy and that as the needs increased more and more new resources have been spent to meet them. The history of technology tells us that in the middle of the 19th century 94 percent of all the energy used in the world was of animal and human origin, whereas a century later in 1950 the proportion was reversed and 94 percent of it was of technical origin and 6 percent of muscular origin. History also tells us that wood was the basic fuel at the end of the 18th century even in the then developed countries. The industrial revolution was the one that was to bring fossil coal to the fore, once "king steam" was enthroned, because the mechanical development of production was hit by the growing depletion of the forests and the forestry industry's inability to meet the demands for fuel any longer. Later on the appearance and expansion of electric engines even further increased the importance of coal. As a result coal was covering three-fourths of the energy requirement in the first decade of the 20th century. The shift from one energy source to the other made it possible to solve two problems, first the energy shortage, if production and consumption had had to be limited to the first resource (wood), and second, protection of the forest reserve, which was now released from the pressure of the industrial pursuit of energy.

The appearance of petroleum-based engines gradually led to a massive gain in the importance of petroleum among the energy resources, especially in the second decade of the 20th century, and the process became even more extensive after World War II. It is interesting to note that this process was not due to any shortage of fossil coal, for the known world reserves including those at great depths would last for more than 1,000 years, but to the circumstance that petroleum proved easier to handle although its reserves are much less than those of coal and, most important, it was to be had at very low prices for a long time. Therefore it is not strange that a technical conception developed making energy consumption per unit of useful output a quite secondary consideration. More or less the same thing was true of many raw materials bought relatively cheap. Consequently the technical and technological conception of production as developed until recently in the world was characterized by a great waste of energy aggravated in turn by irrational consumption of raw materials per unit of useful effect. All this also resulted in a corresponding structure of the industries, attaching exaggerated importance to such energy-intensive ones as the iron and steel industry and others.

The onset of the energy crisis in the beginning of the 1970's, which is still being felt today, in itself necessitated a technical and technological restructuring of production in the direction of a much more economical and efficient use of energy resources and of raw materials as well.

As a matter of fact it has been maintained more than once that this energy crisis was caused by economic growth, and the theory of "zero growth" on a world scale was accordingly formulated in order to eliminate it. The falsity of this theory became apparent as soon as the fact was considered that by 1971 the markets in the United States, Western Europe and Japan together were absorbing two-thirds

of all the petroleum consumed in the world. And we must not forget that together those countries also consume over two-thirds of the nine first main ores extracted in the world. Accordingly the "zero growth" theory would impose economic stagnation upon most of the peoples of the world in order to maintain the economic domination of the said group of countries in that way. Nor was there any more truth to the claim, sometimes tragically presented, that the present energy crisis is a physical crisis, in the sense that the energy resources we have on earth are limited and therefore the outcome will be catastrophic unless "zero growth" is accepted. But the promoters of the abominable armaments race forgot, as they also forgot today, that that race engulfs a colossal amount of energy and other resources. The zero rate was not prescribed for it, although in that case it should actually come to a halt as rapidly as possible.

As the facts indicate, the energy crisis that staggered a great many countries' economies is not a physical, material crisis due to any scarcity of natural energy resources. In fact the American official paper itself, "The Global 2000. Report to the President," concluded that "The world's finite fuel resources of coal, crude oil, natural gases, bituminous shales, bituminous sands and uranium are theoretically sufficient for centuries on end."

Essentially, the causes of the energy crisis are the outmoded structure of the energy-intensive technical and technological system of production, the armaments race, the irrational use of energy resources out of preference for petroleum, insufficient investments in research on economic, efficient and profitable use of new energy sources that are entirely or nearly inexhaustible, diversion of more than 500,000 of the world's best scientists and engineers from civilian to military efforts, the imperialist effort to corner petroleum resources as well as others, and the present world economic order, wherein exploitation, force and the policy of domination play such an important part, with bad effects upon the economic development of a great many countries and especially the developing ones because of the growing international economic interdependence.

Accordingly, resolution of the energy crisis requires (a) changing the way the energy resources are used by increasing the proportions of coal, nuclear energy and other alternative energy resources while decreasing the proportion of petroleum; (b) a determined effort to reform the obsolete, energy-intensive structure of the technical and technological system of production, which is especially urgent because the new stage the scientific-technical revolution has entered is aggravating the crisis of the old technical and technological system; and (c) institution of a new international economic order based upon equality, justice, mutually advantageous cooperation among countries, observance of national sovereignty and independence without recourse to policies of domination and threat of force, renunciation of the armament policy and the start of disarmament, so that the peoples can concentrate their potentials upon solution of their economic problems.

Since the resolution of the worldwide structural crisis is a lengthy process and the institution of a new international economic order also takes time, changing the way the energy resources are used and the policies of their conservation and technical-economic rationalization of their use are among the most urgent tasks. But we clearly cannot forget the great importance of technical and technological restructuring of the production process in keeping with the results of the

present stage of the scientific-technical revolution, and of reducing the energy-intensive sectors, subsectors or outputs and abandoning them when and where it is appropriate.

The foregoing generalizations also apply to Romania's energy problems. As the analysis made by the 12th Party Congress and the National Party Conference of 1982 indicates, the Romanian economy has developed some discrepancies over the years that reflect the contradictions in the production structure, with bad effects upon all the other areas of reproduction. The most noteworthy of them is the discrepancy between the development of primary energy production and the overall development of the national economy.

While reflecting the general picture of the above-mentioned causes, this discrepancy was caused among other things by (a) the worldwide petroleum crisis that broke out in the last decade and led to an extraordinary rise in the price of that resource (even if it went down somewhat last year), while Romania's domestic petroleum extraction was restricted, and sometimes even lowered, by the limitations of its known reserves; (b) the decline in investments in the heat and electric power industry and fuel production (despite a gain in absolute volume) in proportion to the total investments in industry in a period of rapid and extensive development, as the Statistical Yearbook indicates; and (c) the increase in Romania's per capita primary energy consumption in equivalent kilograms of coal from 3,032 kg to 4,198 kg in 1980 (compared with 3,098 kg and 3,494 kg respectively in Japan, and 2,647 and 3,318 kg respectively in Italy), reflecting an energy-intensive industrial structure.

The discrepancy between domestic energy production and national economic development increased this way, as well as the dependence upon imported energy, while the petroleum crisis (with its huge price rises) and the worldwide economic crisis (which caused great difficulties in the export trade) greatly aggravated the problem, resulting in an energy shortage in the national economy. Matters were and still are greatly complicated by the development of some energy-intensive subsectors and outputs out of proportion to the dynamically considered needs of the domestic market and to the possibilities of profitable export, by some energy-intensive manufacturing technologies in various other sectors, and by overproportioning of some products or their design out of proportion to the effort and useful effect. All this helps to explain why Romania obtains 2-2.5 times less national income per kilowatt-hour consumed than France does. And finally, we must not forget that last year's drought reduced the output of hydroelectric power by two-thirds.

As indicated at the 12th Party Congress and as Nicolae Ceausescu has repeatedly pointed out, the resolution of this contradiction requires extremely strong action primarily in the following directions: (a) allocation of heavier investments in immediate and more rapid development of the domestic energy reserves; (b) changing the primary energy consumption pattern by more emphasis on coal and more extensive use of other alternative sources; (c) restructuring industry and its sectors, subsectors and products as soon as possible by abandoning the energy-intensive ones and especially the unprofitable ones whenever possible and appropriate; improving manufacturing equipment and technologies by drastic reduction of the energy inputs per unit of useful effect in order to reach the respective

parameters in the developed countries; emphasis upon the modern, highly technical sectors; and radical improvement of product quality (As we know, products of unsatisfactory quality are among the greatest enemies of economic progress), primarily in the machine building and chemical industries because they play a key part in the other sectors' specific energy consumption; and (d) posing the problem, as emphatically as necessary, of securing a much more really efficient use of energy (and of raw materials as well) in the operations of all industrial units for construction, transportation etc.

Energy conservation has accordingly become a national problem. Industry\* is to do most of the conserving because it is the greatest energy consumer in Romania. But all sectors of the national economy and all workers must contribute to the effort to make rational and economical use of energy. The fight against waste is invaluable.

It is clearly a matter of concentration of the entire people's efforts under party leadership. The effort to overcome the discrepancy between energy production and the nation's energy needs and to secure the steady development of the economy is based upon all the workers' desire for progress and betterment.

#### Energy Independence As the Main Objective

ION MAIEREANU: While at the beginning of the century three-fourths of the world's consumption of primary resources was supplied by coal, consumption of petroleum surpassed that of coal around the 1960's because petroleum is simple to use and its price was low, and it now accounts for two-thirds of the total consumption of energy resources. Consumption of fuels and energy is still increasing rapidly. The forecasts for the year 2000 indicate a consumption 2.5 times greater than that of 1975. It is estimated that at this rate mankind's known petroleum reserves will be exhausted in less than 30 years and those of natural gas in about 50 years.

The solution of the vital problems of supplying the energy and fuels essential to economic development and satisfaction of the consumer requirements has become an increasingly difficult problem. The effects of energy upon the economy and society as a whole are mainly due to the fact that energy is an indispensable basis for all economic processes, since no economic activity is conceivable today without it, while energy engineering itself is a by no means negligible portion of economic activity in general. Consequently energy policy is a prime factor in the policy of any state.

The onset of the world energy crisis in the beginning of the seventh /sic/7 decade made it a first necessity to reappraise on a broader and more realistic basis the further development of this important sector of man's activity. But rapid structural changes are impossible in this field because of the large volume of investments in energy technologies and equipment as well as the long time it takes for research, development and implementation in industry of new procedures and the associated energy infrastructures. Furthermore, while the demand for energy is showing a high growth rate the energy sources are not increasing in the same proportion, and the so-called traditional sources are limited. It is quite rightly stated today by the world's most reknowned experts that the best source of energy is its conservation.

\*In all its aspects.

Socialist industrialization is the prime factor in the consistent party and state policy of harmonious, proportional development of the national economy. We now have a modern industry with a high level of mechanized and automated energy equipment. Under those circumstances and in view of the worldwide energy crisis, further development of the energy base and rational management of all energy resources are vital problems of the Romanian economy.

Energy equipment of labor is a well-known factor for growth of social labor productivity. Continuity in the supply of energy in general and of electric power in particular can prevent a number of interruptions in the production processes with favorable effects upon labor productivity as well as the degree of use of the production capacities. The latter consideration is particularly important to the fullest possible exploitation of the large modern production capacities built in Romania in the last few decades. Moreover further improvement of living and working conditions, a primary aim of the CPR's policy, calls for persevering efforts to carry out the measures specified in the energy program adopted at the Plenum of the CPR Central Committee of 31 March 1982.

It should also be noted that energy is an essential factor for accelerated development of the raw material base and of agriculture. Implementation of the land improvement program, increasing the area of irrigated lands, attainment of an intensive agriculture by use of greater quantities of fertilizers and further agricultural mechanization, and extraction of the needed raw materials from deposits poor in useful substances and in geologically unfavorable locations all depend upon solution of energy problems in keeping with the tasks the party has assigned.

In order to achieve national energy independence, the CPR and its secretary general have adopted and are consistently promoting the policy of developing the domestic energy base by means of priority development of production of crude oil, natural gases, higher and lower-grade coals, bituminous shales, hydroelectric power, nuclear energy, energy from new sources, reusable energy resources, and other resources that can help to make up the nation's energy reserve. Moreover production of heat and electric power generated primarily in heating plants burning lower-grade fuels and, in the future, nuclear fuel has been developed and is still being developed steadily. Some of the most significant features should be noted in order to fill out this general picture.

First of all the effort to make better use of the high-grade fuels in the national economy should be mentioned, such as the hydrocarbons for chemization or the higher-calory (bituminous) coals for coking to supply metallurgical production. Meanwhile the construction and activation of big capacities burning low-grade coal or lignite for power have been a major concern for about the last 20 years. The Doicesti, Isalnita, Oradea, Rovinari, Turceni and other power plants have now been constructed, with a total installed capacity of 6,912 megawatts based on coal. Other coal-based power plants are under construction, with an installed capacity of 3,494 megawatts, as well as the Anina Power Plant based on bituminous shales. Meanwhile the outputs of the power plants burning natural gases and especially fuel oil have been restricted, while special efforts are being made to lower the consumption of hydrocarbon additives to maintain combustion in the installations burning lower-grade coal. We have begun converting some heat and electric power plants to coal that were burning hydrocarbons. Development of combined heat and electric power production has been given priority as a major

source of fuel conservation, and it is also planned to develop district heating so that all new heat and electric power plants will be for district heating in the next five-year plan.

Exploitation of the hydroelectric power potential is another priority that is still consistently promoted. The current five-year plan calls for installation of a capacity of about 2,500 megawatts in hydroelectric power plants, compared with about 3,600 megawatts installed in the whole period since the liberation, and another 3,600 megawatts are to be installed in the 1986-1990 plan. For complete exploitation of the hydroelectric power potential, construction of small hydroelectric power stations will also be expanded so that there will be over 1,500 of them by 1990.

Short of describing all the other priority aims of this period in detail, it should be noted that they are all intended to achieve national energy independence, such as preparations for building the first nuclear-electric power plants, provision for a suitable structure of the national electric-power system and its optimal performance from the standpoints of safety in operation and economy, and extensive preparations for exploitation of new energy sources (solar, wind power, geothermal, biogas etc.) and reusable energy resources, whose share in consumption will be considerably increased.

The proportion of power equipment assimilated and manufactured in Romania in the construction of the electric power plants will be considerably greater than it was in the first electrification period. Moreover, because of its technical standard Romania has been one of the countries exporting power installations and technologies for several years, especially in the form of technological consultations and services and including complete deliveries of power capacities as well as participation jointly with other countries in construction of power capacities.

In analyzing the phenomena and trends in the energy field, Nicolae Ceausescu has repeatedly said that in view of the limited nature of the energy resources and the economic forecasts pointing to increasing difficulties in the future procurement of the traditional energy bearers and petroleum especially, we must take firm measures to considerably reduce energy consumption, to use energy more efficiently, and to cut losses and eliminate waste of energy and fuels in all fields of economic and social activity.

The increased consumption of fuel and energy is not fully justified by the additional production increases. Therefore very resolute action must be taken to find some new technologies consuming less energy and to improve the outmoded, energy-intensive technologies.

Major progress has been made in implementing the party and state policy for better use of the energy resources the Romanian economy has, as indicated on the economic level by the ratio between electric power consumption and the growth rate of the social product. While in 1970 the annual growth rate of the gross consumption of electric power was about 13.4 percent and that of the social product was 8 percent, in 1980 those rates came to about 5.4 and 9.5 percent respectively. Yet there are still some great reserves for rational use of energy, since the energy input per unit of national income is greater in Romania than in a number of developed countries.

There is a very broad field for energy conservation, from improvement of the productivity of the production lines and equipment, recovery of waste energy and energy with a low potential, and energy rationalization of the sectors on the level of the national economy down to household use.

Consistent promotion of technical progress is a policy with favorable effects for reduction of energy inputs, from the standpoints of both increased productivity and actual reduction of the energy inputs per unit of output. Therefore the effort to intensify energy use and to further reduce the energy inputs must begin in the stages of design and construction of the industrial capacities, with selection of highly productive equipment and technologies, curtailment of energy-intensive materials, maximum recovery of reusable energy resources, and correct choice of the energy-bearing agents, so that the least possible primary energy resources will be consumed on the level of the entire economy.

Furthermore reduction of energy inputs critically depends upon modernization of the material production structure. Thus in cast iron and steel production, one of the great consumers of primary energy, processes are now being expanded for steel production in oxygen-blown converters, which consume 3 times less energy than Martin furnaces per ton of steel, for electric steel production in high-capacity electric furnaces (100 tons), and for continuous casting of steel, which precludes the necessity of casting steel ingots and thus eliminates a stage entailing great losses of energy in the form of heat. The blast furnaces are also heavy consumers of energy and accordingly subject to improvement, by improving the composition of the charge, by raising the temperature and pressure of the air blast, and by using turbines to recover energy from the gases under high pressures at the blast furnace exhaust.

The following are noteworthy among the major measures to modernize the technologies in the chemical industry to good effect in reducing the energy inputs: application of modern processes to the manufacture of butadiene, modernization of the existing installations for catalytic cracking in the big petrochemical combines, modernization of the primary distilling installations in the old refineries, and retirement of some old, energy-intensive installations for making acetylene from calcium carbide, ammonia etc.

The machine building, construction materials and light industries also still show great possibilities for energy conservation both by modernizing the production lines and equipment and by optimal management and operation of the production process from the energy standpoint.

Recovery of reusable energy sources is one of the main ways of reducing the total and specific energy inputs. Accordingly the technological specialists have the particular task of acquiring a thorough knowledge of industrial energy engineering, while the energy specialists who design and operate industrial installations must improve their knowledge of the particular technological processes.

By 1985 the energy output from reusable energy resources will cover 10 percent of the total consumption of primary energy resources, which is a considerable contribution to the national energy reserve. Some major courses of action are intended to accomplish this, such as accelerated construction and punctual activation of the capacities with the recovery installations specified in the plan, intensified

study and expedited completion of new and efficient technologies for the resources that still lack exploitation procedures, and more rapid assimilation and placement in manufacture of the particular equipment and installations to recover those resources.

The effort to make the best use of all Romania's energy resources presents a broad field for scientific research and technological development, because technical progress will be more and more the main support of energy's constantly growing contribution to national economic and social development. The close connection between the technical and qualitative standards of the output and energy conservation throughout the national economy is pointed out in the Program for Higher Technical and Qualitative Standards of Products, Lower Inputs of Raw Materials, Fuels and Energy, and Better Use of Raw Materials and Materials in the 1983-1985 Period and on to 1990, approved by the Plenum of the CPR Central Committee in November 1983.

All these points of economic policy and practical measures are to serve the major aim of Romanian energy policy, namely national energy independence, as well as the best possible use of the production factors and further improvement of the ratio between energy consumption and growth of the national income and social product. Every Romanian worker and citizen, as a creator and beneficiary of the entire national wealth, must take part in this extensive effort.

#### The Mining Industry as Producer and Consumer of Energy

V. GH. SCRIPAT-FLORESCU: In the light of the demands of the national economy and the effects of the worldwide energy crisis, the Plenum of the CPR Central Committee of 31 March 1982 analyzed, discussed and approved the measures and tasks to carry out the energy production program in this five-year plan and to develop energy resources up to 1990. The measures and objectives in the program drafted at Nicolae Ceausescu's suggestion further develop the provisions of the Program-Directive for Energy Research and Development in the 1981-1990 Period and Main Objectives up to the Year 2000, approved by the 12th Party Congress, calling for development of energy resources and expansion and development of the national electric power system so that Romania's energy independence will be achieved ahead of the original provisions.

The program calls for intensive growth of coal production from 37.8 million tons in 1982, or 44.4 million tons in 1983, to 102 million tons by 1990. Meanwhile the proportion of coals in the national energy reserve will be increased to 47 percent in 1985 from 26 percent in 1980. Major increases are planned for this purpose, especially in the output of lower-grade coals (lignite) now being burned by the big power plants like those at Isalnita, Rogojeiu, Turceni din Oltenia, Doicesti-Dimbovita, Oradea etc. An output of 53 million tons of lignite and brown coal is specified for 1984, or 25.9 million tons more than the 1980 output. The possibilities are now being studied of increasing the output of lignite and brown coal to 100 million tons in 1990, or 10 million tons more than the original provision.

The program for developing energy resources also calls for working some deposits of coal of poorer quality, so that a new fuel will appear upon the Romanian energy scene in the form of bituminous shales from the Anina-Banat region, where a

power plant is under construction that will be equipped with 330 megawatt generating sets. The pit from which the bituminous shales will be extracted is being opened up and is ready to supply the power station's first generating set, which will be activated soon. The pit will produce 10 million tons of bituminous shales in 1985. Meanwhile the combustion tests of the coal in the Sfintu-Gheorghe-Covasna lower-grade lignite deposit made in collaboration with the Ministry of Electric Power have proved that this coal is fit for industrial use, and design of a heat and electric power plant in the area has begun.

The coal reserves intended for electric power production also include the bituminous coals extracted from the mines of the Valea Jiului and Anina-Banat coal regions, the extraction of which is to be considerably increased (to 15 million tons in 1985 from 9.7 million tons in 1980).

The lignite output is to be increased both by developing the existing capacities and by opening up new mine fields. The major development of energy coal production is in the Oltenia coal regions, where over 85 percent of Romania's entire lignite and brown coal output will be extracted in 1984. Some new production capacities are to be activated for this purpose at the coal pits in the Rovinari, Motru, Jilt, Vilcea and Mehedinți regions. In addition to these large production units, the reserves in the outcrop areas of the coal strata or in the marginal areas are being exploited more intensively by means of small coal pits, since those reserves could not be extracted by means of underground technologies or the large pits in which high-capacity bucket-wheel excavators operate.

No intensive development of coal production is possible without consistent observance of the party administration's guidelines on intensive development of mechanization of mines and pits through an extensive program for outfitting them with highly productive and accordingly highly technical equipment. It should be noted here that 28 more production lines will be activated by the end of 1985, including 18 lines to be constructed in 1984, in addition to the 43 lines for excavation and transportation that are equipped with high-capacity bucket-wheel excavators.

Meanwhile, in order to develop the existing mines and to construct some new capacities for underground extraction, it is planned to provide equipment for mechanized coal extraction: In 1984, 25 more mechanized cutting assemblies will be added to 102 existing ones in operation and 39 more will be added by 1985. This equipment will raise the proportion of mechanized underground coal extraction from 56 percent in 1983 to 65 percent in 1985, and when the output from the coal pits is added to this, 84 percent of the total coal output will be extracted by means of completely mechanized technologies.

Alongside the efforts to develop the production capacities, the mining units are concentrating on the quality of the coal delivered to the power plants. The measures taken by the mining units to ensure the quality of the energy coal were based on the provisions of the program approved by the party administration as well as the detailed programs adopted at the level of the mining combines and enterprises with priorities on regular test drilling in advance of the coal strata in pits; separate extraction of the intervals of useless rock over 0.4 meters thick in the coal strata worked in pits by providing them with low-capacity bucket-wheel excavators; construction of installations for crushing and grading the

lignite (The first installation has been activated at the Girila pit); correct application of the technologies for working the faces in order to reduce the quantities of useless rock contaminating the mass of extracted coal; proper organization of the separation points for useless rock in all mines; and separate transportation of coal and useless rock or scheduling underground transportation to avoid mixing the coal and the useless rock in the course of it.

Major problems of conservation and better use of energy are facing the mining industry as a consumer of heat and electric power. The Ministry of Mines has many concerns in implementing the tasks set by the party administration in connection with rational management and conservation of all forms of energy. These concerns apply to all levels.

The technological mining processes for extracting and preparing the useful mineral substances, as we know, have a number of distinctive features, because a large portion of extraction work is underground, where the geological conditions of a deposit can generate high pressures, water flows, eruptions of gases and other phenomena that complicate the technological processes and cause a number of inconveniences in connection with energy. Yet the objective and vital necessity of conservation and rational management of energy requires concentration of the planning efforts of all specialists in the field upon solving the technological and energy problems so as to obtain a constantly growing economic effectiveness in the extraction and preparation of the useful mineral substances.

The following are noteworthy among the major efforts to reduce the energy inputs in the extractive mining industry: restriction of the output of energy-intensive products as, for example, the salt obtained by the technology of evaporating brine, the output of which will be closely correlated with the domestic and export market demands, or lignite briquettes, which are heavy consumers of fuels and electric power; rationalization of underground consumption of compressed air (Since pneumatic energy accounts for more than 50 percent of the mining units' direct consumption of electric power, special emphasis is placed upon the most efficient possible production of compressed air, cutting losses in its distribution and transportation to the consumption points, and more productive use of the pneumatically powered installations and equipment); improved extraction and preparation technologies, in view of the fact that about 93 percent of the electric power in the mining industry is used for technological purposes; and rationalization of the voltage of the electric current used at the work places.

Special programs are drafted in every unit for accomplishing the aims of conserving energy resources. These programs are updated regularly in keeping with the findings of the research and design institutes or the results of other countries with developed mining industries.

Standardized inputs of energy, fuels and other materials are heavily emphasized, as well as strict observance of the standards. In view of the particular conditions of the mining industry where, as we said, the work is greatly affected by the natural conditions of the deposits, the consumption norms cannot always show constantly declining trends in the case of all products. Yet the efforts made and the measures taken to enhance energy effectiveness have produced a number of good results in reducing the specific inputs from one stage to the next. For example, intensified use of bucket-wheel excavators reduced the specific consumption of electric power from 2.92 to 2.38 megawatt hours per 1,000 tons of coal

extracted. The electric power saved this way amounts to the total consumption planned for 1984 of one mining unit with an annual output of more than 1 million tons. Moreover specific consumption in extraction and preparation of lead, zinc and copper ores dropped from 21.7 to 20.4 megawatt hours per 1,000 tons extracted and from 32.5 to 31 megawatt hours per 1,000 tons prepared. Good results have also been obtained in other activities, such as preparation of the coals, extraction and preparation of nonmetallic mineral substances, and extraction of iron and other ores.

Regarding reduced consumption of fuels and thermal energy, the mining units are relatively unimportant consumers in the economy, but they have adopted programs and measures to improve their technologies and lower their inputs, especially the nontechnological ones. The main objectives in this area include reduction of fuel consumption by reactivating and expanding transportation by cable cars, conveyor belts, mine railways or conduits of mining products; reduced consumption of natural gases and petroleum fuels in the preparation of nonmetallic and iron ores accompanied by recovery of the reusable energy resources from the process furnaces and the solid particles discharged in the smokestacks; introduction of gas generating installations in the first stage of preparation of feldspar and dolomite; conversion of heating plants from higher-grade fuels to solid fuels; and introduction of heat pumps and heat recovery from the end coolers of the air compressors in order to prepare domestic hot water on the mine premises.

In pursuance of the vital objective set by the party administration of achieving national energy independence, the workers collectives and technical-engineering personnel in the planning and operations of the mining industry are concentrating their efforts both on increasing coal production and exploiting the reserves in deposits more intensively and on conserving energy resources of all kinds.

#### Priorities in Romanian Power Engineering

NICOLAE ARMENCOIU: It is a proven fact that energy in general and electric power in particular condition the activity of any society, and that the more developed the respective society is the more intensive is this conditioning. This fact is confirmed once more in the present stage of the Romanian national economy, when activity in the energy field is reflected in social and economic activity and constantly growing quantities of energy are required. But these quantities are obtained under increasingly difficult economic conditions because of the quantitatively and qualitatively limited deposits of fossil fuels as well as the considerable investments needed to exploit the hydroelectric power resources.

For all these reasons the CPR and its secretary general have made rational exploitation and the most efficient use of the nation's energy resources priority tasks in the energy program. These tasks also include intensive use of the existing energy installations as well as activation of the energy capacities properly and punctually. Their fulfillment is inseparable from the responsibility with which all those working directly in the energy field or one related to it must act.

The most efficient use of the lower-grade fuels found in Romania is to burn them in big heat and electric power plants, three of which have been built and are in operation to exploit the lower-grade lignite found in Oltenia and are all located in that area, namely the Isalnita plant, with an installed capacity of 1,035

megawatts, the Rovinari plant, with one of 1,740 megawatts, and the Turceni plant with one 1,320 megawatts and ultimately a double capacity.

Enhancing the quality and effectiveness of the performance of these big plants in Oltenia is a most urgent and important task. A number of measures are to be taken for the purpose, such as improving and expediting the repairs on the generating sets in order to lengthen the period of each machine's operation, preparing the coal beforehand to make the boilers more productive and decrease the hydrocarbon additives, equipping all boilers with postcombustion grates for complete combustion of the coal, etc. Automation of these plants will be intensified, and an extensive program is being perfected to enhance safety in operation, which program includes improvements on all the component elements, such as mills, pumps, slag vents, electric filters, auxiliary electrical equipment, etc.

The Cernavoda Nuclear-Electric Power Plant, construction of which is in full course, is the most important energy capacity. This plant's final capacity of 3,500 megawatts will be an important contribution to the nation's energy reserve, and it is to be activated in stages beginning in 1986. It is a first nuclear capacity in an ample program to construct other nuclear electric power plants. Along with the design operations in the specialized units of the State Committee on Nuclear Energy and of the Ministry of Electric Power, intensive construction-installation operations are now going on at the worksite. Note that a great many components assimilated by national industry will be used in this first nuclear capacity of Romania's. In view of its energy significance, technical novelty, and short activation deadlines, the best cadres of specialists are now devoting all their energies to the successful solution of the complex problems that arise.

The Anina Heat and Electric Power Plant based on bituminous shales, which will ultimately have an installed capacity of 990 megawatts, is another big energy capacity for which design and construction-installation operations are going on simultaneously. The construction for the first time in Romania of a heat and electric power plant based on bituminous shales has presented a number of designing problems in connection with construction of the equipment and the nature of the location, making this plant an absolute first in the nation and even unique in the world because of the characteristics of the shale. A number of improvements based on experience in operating the Rovinari and Turceni heat and electric power plants have been made in the equipment and operating plans of this plant in the course of its construction.

A highly efficient energy measure to meet the requirements for electric power and heat is the introduction of district heating with combined production of electric power and heat. Besides the saving in fuel that it makes, district heating permits effective use of lower-grade coals and helps considerably to release the hydrocarbons for more advantageous purposes, and it also has the advantage of better environmental protection than production of heat in individual installations. Therefore in the future the new heat and electric power plants will be for district heating alone.

At the end of last year the installed capacities of the district heating plants in the national energy system totaled about 4,300 megawatts, or one-third of the capacity of all heat and electric power plants, and supplied 80 million gram calories of heat. District heating saved about 2.8 million tons of conventional

fuel in 1983. A number of district heating plants in Suceava, Iasi, Bucharest-Progresul, Giurgiu, Arad, Timisoara, Oradea, Drobeta, Turnu-Severin, Craiova II etc. are now in advanced stages of construction. The worksites of other district heating plants are soon to be opened up in Brasov, Bacau, Tigru Jiu, Slatina etc. All these new plants will produce a quantity of 8.5 billion kilowatt hours of electric power by the end of the next five-year plan, making a major contribution to the national power reserve while producing a quantity of 27 million gram calories of heat. These are arguments indicating how necessary it is for all these plants to be activated on time or even ahead of schedule.

While the new district heating plants are being built, some existing power plants burning hydrocarbons are to be converted to coal. Work on this has begun at the Govora and Pitesti power plants, and others (Bucharest-West, Palas etc.) are being considered for conversion to coal.

Thanks to construction of the new district heating plants and conversion of some existing power plants to coal, by the end of the next five-year plan a total quantity of hydrocarbons amounting to about 6 million tons of conventional fuel will be released for chemical processing. A sustained effort is also being made to improve the district heating network. Studies are under way to further improve procedures and to enhance the economic and energy effectiveness of the district heating systems. The most important studies concern improvement of the construction procedures by promoting inexpensive substitute materials incorporating less energy, improvement of the overall design of the system by perfecting the applied plans, enhancement of efficiency and safety in operation by controlling and computerizing operations, etc.

It is quite rightly said that conservation of energy is the cheapest energy source. When the technological processes have large, excessive specific inputs and the use of energy shows an irrational consumption or even a waste, conservation of energy is not only possible and necessary but is first of all a high patriotic duty of every specialist and every citizen. The conservation measures must be applied alike by both the producers and the consumers of energy.

As for the units producing electric power, a number of measures have been adopted to cut the losses in the power networks. Some are already implemented and others are being applied. They were the result of regular and intensive research, studies and designing over several years. Thanks to all these measures the power losses in networks steadily declined from 7.8 percent in 1970 to less than 6 percent now, and they will be down to about 5 percent by 1985.

The measures applicable to consumers can be divided into two categories, namely immediate and long range. The first category includes rational lighting; introduction of appropriate working schedules and programs correlated with the necessities of the power system; control, regulation and coordination of consumers according to the smallest possible units; elimination of superfluous or superseded operations; a number of recoveries of power losses and of secondary resources, etc. The long-range measures are still to be considered and organized, since they require investments in order to modernize the present procedures and technologies, and they include practically all activities from reconsideration of the energy-intensive processes and products and introduction of new industrial technologies to reconsideration of thermal insulation of dwellings. Not until all

these measures are completed can we carry out the priority tasks the CPR has entered in its program of securing the unrestricted development of Romania's national economy and achieving national energy independence.

#### Valuable Experience and Unused Reserves

NICOLAE LICIU: Of course it is a truism to say that there is an interdependence today between a country's socioeconomic development and the energy supply of that development. Examination of that interdependence and consideration of it in the international context are now primary concerns in the economic policies of all states of the world.

As for Romania, it is a well-known fact that development of the energy reserves and the energy supply of the planned economic growth have been and are priority objectives of the general strategy for Romanian society's prosperity. The provisions on energy resources and consumption in the 1984 Uniform National Plan carry out and emphasize the aims of the energy program approved by the National Party Conference toward more intensive development of domestic energy production accompanied by the most sparing management of fuels, motor fuels, electric power and heat.

The output of energy bearers is to show major gains, reaching 61.7 million tons of fine coal, 13 million tons of crude oil, about 33.5 billion cubic meters of methane gas including free gases, and 77 billion kilowatt-hours of electric power. On this basis and in accordance with the plan law, about 94 percent of primary energy consumption will be supplied by domestic production this year. The national energy reserve is made up of a higher proportion of solid fuels, water power, and new and reusable energy sources, with a considerably lower consumption of hydrocarbons and especially of petroleum products.

In the field of heat and electric power, it is important to implement the programs adopted to make more intensive use of the installed capacities of the power plants burning coal and to activate all installations punctually in the plants consuming solid fuels, water power or secondary resources, while increasing the efforts to reduce the internal technological consumption of power plants, transformer stations and the power transmission and distribution networks.

It is evident that the guidelines for developing Romania's energy reserves are in full accord with the constructive trends appearing in world energy engineering. They take account of the conclusions of the recent studies of the long-range evolution of the energy problems as well as the ways of introducing the new in the production processes and energy consumption.

Of course the difficulties are well known that we are encountering now in meeting the requirements for energy and especially for electric power, as well as the causes of them. Those causes (faulty operation of the coal-based power plants, including tardy and unsatisfactory repair of the installations; late completion of investments in the units burning lignite and shales and in the hydroelectric power plants; and failure to secure the necessary primary energy due to lack of water in the hydropower assemblies and to nondelivery of the natural gases according to the approved program because of increased consumption in other sectors) can and must be overcome in the next period in order to remedy the state

of the consumers' power supply by providing them with the specified quantities, especially under the more difficult conditions of the cold season.

The measures are also well known that are specified in the program considered and approved at the joint session of the Political Executive Committee of the CPR Central Committee and the State and Government Council in November 1983 providing for electric power production and reduced consumption of fuel and energy. In this connection it is important to reschedule some capital repairs and checks of power-consuming installations for this season. It is also important to reexamine the manufacture of energy-intensive products in this period, since it is known that the production cost of electric power is appreciably higher in winter than in the warm season. Calculation of the manufacturing costs of some energy-intensive products, allowing for this difference, would lead to interesting conclusions about the effectiveness of their production in the cold season, and we believe it would result in their seasonal production, which has in fact been started in the case of cement. Of course such calculations to determine effective production and export structures should be made by means of a correlation on the level of the national economy, based on the determined cumulative inputs of energy needed for every product or activity. That is the only correct way to cover all the influences, from extraction or procurement of the raw materials to manufacture of the finished product. Allowance should also be made for consumption in the use of each product, all in proportion to the useful effect obtained, of course.

As it is planned for all activities in the years to come, action is to be taken in the power field to bring production up to the specified quantitative and qualitative levels. The qualitative parameters for the electric power produced take the form of assured continuity of the consumers' supply and constant frequency and voltage. Therefore the power system must be developed and operated so as to ensure observance of these requirements, since any failure to observe the qualitative parameters can be regarded only as a temporary situation impairing the efficiency of the socioeconomic activity that must be remedied immediately.

A recent study of the United Nations' Economic Commission for Europe indicates that it will be possible to make energy savings up to 19 percent in the region by the year 2000 by the alternative of energy conservation, instead of continuing the present trends toward securing socioeconomic development with energy. According to sectors, it is estimated that energy savings could reach 25 percent in the household sector, 21 percent in industry, and 10 percent in transportation. Some important differences among countries are acknowledged, but it is concluded that in all cases the greatest energy savings are to be expected in modification of the final demand for heat.

In evaluating the possibilities of worldwide energy coverage, the study does not proclaim zero growth of consumption as a necessity for socioeconomic development, but it notes on the basis of the analyses that the total consumption of primary energy throughout the ECE region will increase by 46 percent in the 1980-2000 period, and that of final energy by 42 percent.

For the intermediate and long term, introduction of new technologies and modernization of existing ones are major ways of reducing energy consumption and increasing the national income obtained per unit of energy consumed.

Analysis of the technological stage reached by the Romanian economy reveals noteworthy progress in that direction but also some considerable reserves in all activities. A significant example of primary energy conservation is afforded by the development of industrial and urban district heating in Romania by 1980, whereby combined production of heat and electric power saved about 3 million tons of conventional fuel compared with their separate production.

Analysis of the possibilities for energy conservation in heat and power engineering indicates the following main methods: improvement of the technical-economic characteristics of the traditional installations (raising the "entry" parameters of the steam, bringing the energy transforming process closer to the ideal cycle, increasing the productivity of the various elements of the system, etc.); introduction of new energy transformers; development of district heating and centralized heat supply; and use of new methods of coping with the "peak electric charge" (hydroelectric power plants with storage and pumping, buffer consumers, etc.).

These measures and many others were also discussed at the Second National Conference of Romanian Energy Engineers held recently in Bucharest, where it was demonstrated that the workers in the energy field are capable of action to meet the immediate and long-range requirements for the development of Romanian energy engineering in accordance with the planned growth of the national economy as well as worldwide technical and qualitative standards.

There are also major reserves for reducing energy consumption in other sectors. Ferrous metallurgy, for example, produced about 13 million tons of steel in 1982 but a very high proportion of it (34 percent of the total) was made with the energy-intensive Martin process. Praiseworthy efforts of metallurgists lowered the proportion of this process in the Ministry of the Metallurgical Industry's enterprises from 38.9 percent in 1980 to 36.1 percent in 1982, but there is still a long way to go in view of the steel production structure in various advanced countries as follows:

	In percentages			
	Italy (1979)	France	FRG	Japan
Converter steel	42	83	78	75.5
Electric steel	53	16	15	24.5
Martin steel	5	1	7	0

In view of these major reserves in Romanian ferrous metallurgy, the Program to Increase Labor Productivity (approved by the Plenum of the CPR Central Committee in November 1983) assigns the task of equating consumption of coke, energy and fuel, as well as the coefficient of extraction of rolled products from 1 ton of steel (which also affects energy effectiveness), with the best world results.

In aluminum production various countries are making sustained efforts to shift to less energy-intensive technologies. The ALCOA process is being studied, which reduces consumption by 30 percent, as well as another process developed in the United States that lowers energy consumption by 90 percent.

It is a modern trend in the cement industry in the advanced countries to replace methane gas with coal. It is considered possible to considerably reduce the requirement for energy resources by combining and integrating the energy consuming processes. New and less energy-intensive processes are being recommended in the technical literature for agriculture. In order to conserve energy in plowing, it is intended to reduce resistance to the plow by coating it with plastics or polymeric resins, serving to reduce the energy consumption by as much as 25 percent.

It is planned to introduce a new technology for shipping commodities including fuels, namely shipping in tubes and containers, being tested in Romania. It is estimated that use of linear motors in transportation will be expanded in various countries and by 1985 automobiles consuming 4-5 liters per 100 km, etc. will be marketed. We are also very interested in the Scandinavian experience in development of new principles for urban constructions and of new fuel and energy saving household appliances and installations. The same purpose could be served by wide-scale use of infrared thermography of localities and industrial districts to detect sources of wasted heat and to determine the optimal levels of thermal insulation.

Upon examining the present state of energy conservation in Romania we find that the goals set in the Directive-Program for Energy Research and Development, approved at the 12th Party Congress, must be further pursued as main courses of action. Attainment of these goals will also be aided by the provisions of the programs approved by the Plenum of the CPR Central Committee in November 1983 for raising labor productivity and the technical and qualitative standards of the products. These programs emphasize promotion of new technologies, modernization of the existing ones, and more rapid introduction of scientific advances in all sectors of the economy.

No 4, 25 Feb 84 pp 15-20

#### Structural Changes in the National Energy Reserve

AUREL IANCU: Under the present circumstances the party and state are heavily emphasizing more rapid development of energy production through exploitation of the available natural resources, even those poorer in useful substances, through wide-scale use of advanced technologies in the field of petroleum and mining, and through more efficient management of all domestic mineral resources. This will make it possible to achieve the strategic aim of national energy independence even before the time set by the 12th Party Congress.

Extensive structural changes are to be made in Romanian energy engineering in keeping with the amount and structure of the existing reserves of energy resources on Romanian territory and the new requirements of the economy. According to the provisions of the Directive-Program for Energy Research and Development for the 1981-1990 Period and the Main Guidelines up to the Year 2000, development of energy resources is taking the following main directions: intensified exploitation of the hydropower potential through installation of both small and high-capacity hydroelectric power plants to increase the use of this potential from about 30 percent in 1980 to 65 percent in 1990 and nearly 100 percent by the end

of the century; expanded use of lignites and bituminous shales in heat and electric power plants, with a shift to solid fuel in the plants now burning hydrocarbons; development of nuclear power engineering through the program for building nuclear electric power plants, development of mineral raw material resources to meet the requirement for nuclear fuels, and more rapid assimilation, more and more on the basis of domestic design, of the manufacture of equipment, preparation of the fuel, and production of heavy water; exploitation of the new energy sources and technologies in the field of geothermal and solar energy and wind and wave power; more intensive study of biologic conversion of carbon dioxide and the biomass to fuel; extraction of hydrogen from water; and underground gasification to exploit coal reserves that cannot be exploited by mining methods.

All this will lead to radical improvement of the production structure and consumption of primary energy resources, as the proportions of solid fuels, especially lignite, and of nuclear and water power sharply increase and the proportion of hydrocarbons goes down. According to the party's directions, very firm measures are being taken to use the hydrocarbons for chemical processing for their better exploitation and their use for technological purposes.

The proportion of heat and electric power produced from new sources, recovered energy resources, coal and bituminous shales in the national energy reserve will be considerably increased in the years to come.

Expanded and intensified economic and scientific-technical collaboration and cooperation with the socialist countries, especially the neighboring ones and the CEMA countries, are expected to make a major contribution to procurement of the raw material and energy resources of the Romanian economy. Despite its great efforts and notable results in developing its own raw material resources and energy sources, Romania unlike the other CEMA countries has needed for years and still needs to import part of its requirement for fuels, mineral raw materials and metals from third countries with payments in convertible currency, while collaboration and exchanges with the other CEMA countries have been contributing less and less to its import quota of fuels in the last decade, from 47 percent of the total in 1970 to only 21 percent at the start of the current five-year plan.

CEMA's analyses show that taken together the member countries have major reserves that could meet the rational requirements of all of them for the main types of energy sources, fuels and raw materials for a long time to come. Of course this means requirements based on scientific standards, and accomplishment of such an objective requires mobilization and combination of all the CEMA countries' efforts, as well as further development of their bilateral and multilateral relations on the basis of equality, equity and mutual benefit.

As for Romania, it has regularly expressed its interest (at the CEMA sessions in recent years and at the meetings of the Executive Committee of the Council and other CEMA organs) in collaborating in these fields of vital importance to the socialist countries' progress among the economic fluctuations throughout the world, being ready to cooperate in building new investment capacities or in expanding existing extraction and production capacities in countries with resources by participating in geologic prospecting, design or drilling operations and in deliveries of materials and equipment, by lending technical aid, etc.

While developing its energy resources and improving their structure Romania is making an intensive effort, as we know, to manage its resources rationally and to use them more efficiently. As it says in the Decision of the Session of the Supreme Council for Romania's Economic and Social Development of December 1983, Romania regards the processes of conservation and better use of energy as an integral part of its policy of developing its energy resources, for the purpose of coordinating the evolution of the national heritage of accessible mineral resources as closely as possible with the evolution of the extractive and processing procedures, and also for the purpose of creating the most complete picture it can of the use of the energy resources in the national economy.

As the CPR points out, the gap between supply and demand in the energy field must be closed not only by restructuring the energy sources but also by conserving energy, in view of the fact that any waste must be eliminated and that conserving energy is generally more effective than producing it from new sources or even from conventional sources.

Actually, diminishing the demand for energy (or conservation) is one of the most efficient and convenient solutions to an increasingly limited supply of it, which is more and more difficult to remedy with the known reserves. Therefore making a considerably more economically effective use of energy is the chief source and critical requirement for further development of the Romanian economy, and the whole energy system of production and consumption affords great opportunities for it. Elimination of waste and proper management of resources, careful evaluation of the priorities in allocating resources and consumption of energy and materials, and review of the production structure and technologies with an eye to conservation of those resources are essential requirements for current development. These methods produce a maximum effect with less consumption of materials and energy, reduce the pressure upon imported resources and the national heritage of mineral substances, and bring about the best possible conservation of the latter for the benefit of future generations.

It is a known fact that many industrial, agricultural and transport processes still consume large quantities of energy in proportion to the value produced, particularly because they are using old technologies adopted back in the years when the problem of conservation of resources was not so acute as well as energy-intensive sectorial and production structures. Therefore reduced specific consumption and better use of raw materials and energy to take the pressure off the energy reserves have made it increasingly necessary to reconsider the priorities in promoting the technologies and developing the sectors and subsectors of the national economy.

Direct or indirect recovery of energy by means of recycling the material resources is a definitive component of the reproduction process, and it has great possibilities. Theoretically the potential for energy recovery by technological measures can be judged by the difference between the way the primary energy is used in practice and the thermodynamic limit to which it is technologically possible to use the energy. By some calculations the degree of use of primary energy, expressed in terms of the general productivity for the whole economy, amounts to only 38-40 percent of the total quantity of energy introduced into the energy system, and therefore it is unquestionably a vitally important task to find every means of improving this productivity in the case of all producers and consumers.

## Energy Developments Throughout the World

VASILE NITU: The information about the evolution of world energy engineering that is selectively collected takes the form of a conglomeration of figures, tables and curves, many of them contradictory, without expressly indicating the guiding ideas and principles that were basic to the evolution of contemporary energy engineering or the new policies that must be promoted in the immediate or more distant future. A great deal has been written about energy engineering, in the desire to find "the solution" or "the saving solutions," but in the 10 years that have passed since the onset of the petroleum crisis no radical resolutions have appeared.

The state of euphoria induced and fostered by some partisans of the "new energies" gradually disappeared, because the particular processes for obtaining and utilizing those dispersed and intermittent energies proved to be heavy consumers of energy and materials themselves. Accordingly the whole emphasis in developing energy engineering remained on the traditional energy resources and sources, while the specialists took a manifest interest in determining mankind's energy reserves and the possibilities of exploiting them as accurately as possible and it also became very clear that the possibilities of making better use of the existing energy resources and of bringing new energy sources into economic circulation can be enhanced only by developing science and technology.

The following forecasts concerning man's energy reserves are made by combining the effects of the new technologies with the energy resources and sources that are found in nature: Exhaustible energies (in  $10^{12}$  kilowatt-hours): nuclear by fusion, 100 million; nuclear by fission, 547,000; fossil fuels, 55,000; and geothermal, 134. Regenerable energies: solar, 580,000; tides, 70,000; wind, 1,700; and hydraulic, 33.

For a criterion for comparison, we mention that a consumption of  $84 \cdot 10^{12}$  kilowatt-hours is estimated for the year 2000. But in the present stage the only accessible reserves are in fossil fuels, hydraulic power, and nuclear energy by fission, with the economic corrections that appear for each individual technology.

In the last decade, energy engineering has developed more slowly but it has been greatly diversified. The shares of the nuclear-electric power plants in electric power production in 1980 were 11.3 percent in the FRG, 23.6 percent in France, 17.3 percent in Finland, 23.4 percent in Belgium, etc., and according to the current forecasts, by the year 2000 they are expected to be 55.6 percent in England, 33.9 percent in Italy, 52 percent in Sweden, 77.7 percent in France, etc.

The different historical and geographic conditions and energy potentials have made for a great differentiation in the nations' energy endowments. While Norway has over 15,000 kilowatt-hours per capita, many developing countries have less than 1,000 kilowatt-hours per capita. All these differences are further accentuated by the economic factors, for petroleum prices are still high and energy development requires major financial and material resources as well as international conditions favoring transfer of technology, to say nothing of the great differences in efficiency of use of energy, differences that vary between 0.5-1.5 kg of conventional fuel per dollar of national income in the developed countries and 3-10 kg of conventional fuel per dollar of national income in the developing countries.

The World Energy Conference in New Delhi of 18-23 September 1983 devoted most of its proceedings to the developing countries' energy problems. According to the estimates in REVUE GENERALE NUCLEAIRE, these countries' energy situation has deteriorated steadily in the last 2 or 3 years. In 1982 those countries' energy consumption decreased for lack of financing. In the last 3 years their debts have increased by about 60 percent, while the sums needed to meet their energy requirements in the next few years are estimated at \$130 billion. The real problems are clearly financial. This led Jean Arnoux, state secretary for energy in France, to propose "a new world energy order" characterized by stabilization of the fuels market, institution of international financial mechanisms, and extension of the dialogue between the countries producing and consuming energy, between the countries owning technologies and those importing it, and between the financial bodies and the beneficiary companies.

In the present contradictory energy situations the question naturally arises, what is "energy know-how," or the "interdisciplinary energy science" that countries should apply to each one's particular conditions? We find that the attempts to use sophisticated mathematical models have not led to "miracle solutions" because in general the past conditions and trends were extrapolated in more or less garbled forms or concepts peculiar to certain developed countries were generalized to include developing countries. Therefore I think that in the first place it is necessary to consider the applications of the law of entropy to a country's energy systems and its whole energy situation. The future developments, including the "postindustrial societies" discussed by the American futurologists Herman Kahn, Alvin Toffler et al. will conform to the law of entropy as applied to the national energy systems or, on a broader scale, to industrial activity as a whole. But the law of entropy indicates only the direction of change in an energy system. It neither indicates nor imposes the rate of the change. The structure of the energy systems, environmental protection, energy conservation, recycling of resources etc. follow from imposition of a certain growth rate of entropy or "minimum entropy production" as a criterion. This law does not lead to development of mixed energy systems of the technical-biological type that can be more harmoniously integrated in the natural environment and can increase the proportion of regenerable energy sources, photosynthesis processes, action of enzymes, biological conversion, etc.

A country's own exhaustible and regenerable energy resources are the material base of its energy development. This makes it necessary to know the reserves of the various categories of energy and fuels, the technologies for their exploitation, and how long the exhaustible resources can probably help to meet the needs.

The energy requirement must be determined according to the rate, level and structure of social development and correlated with the forecast of the resources and the technological forecast in energy engineering. This means that the forecast of energy engineering's development should reflect the systemic quality of energy engineering, its connections with the socioeconomic system, the results of practical application of scientific-technical advances, the changes demanded by social development itself, and the interdependences with other states' economies or with the world market. It follows from this principle that forecasting the energy requirement is not an independent process determining its own development but one that has to be integrated in the realities of the respective country and its potentials for cooperation in the economic, scientific and energy fields, while the economic structures are to be selected according to the energy potentials.

Energy engineering is a whole technical system, extending over large geographic areas, known as the national energy system, which is a subsystem of the ecosystems of the national economy. The systemic character of energy engineering has great advantages for regional cooperation, as illustrated by the interconnection of the electric power systems.

In application, the principle of the interdependence of the systemic aspect of energy engineering with the organizational forms has been manifested in appropriate institutions providing for coordinated development and management of all energy engineering in the sense defined above, such as energy ministries, national institutes of energy studying its development, a national controller for all energy, engineering institutes, specialized departmental units, etc.

An exponential increase in the volume of information stored in technical and economic documentation (measured in millions of bits) providing for technological progress in energy engineering corresponds to an almost steady growth of energy production. The number and complexity of the new technologies are constantly growing because the proportion of the lower-grade fuels has to be raised and new forms of energy have to be brought into economic circulation, making technological progress an objective necessity. Some countries have succeeded in curtailing their dependence upon the petroleum market through technologies, by building nuclear-electric power plants. France, for instance, produced over 103 billion kilowatt-hours of electric power in nuclear-electric power plants in 1982. Japan has a provision in its updated energy program to install 35,000 MWe\* by 1990 and 50,000 MWe by the end of the century, compared with the 17,177 MWe now installed. The new technologies require huge research and design capacities, calling for preliminary coordination sufficiently far in advance.

Meanwhile it has become increasingly clear that the present stage offers opportunities for adapting the new technologies to the natural environment as harmoniously as possible. For example, under the actual conditions of the nuclear-electric power plants in many West European countries public opinion is convinced that they are less polluting than the traditional power plants. But the new technologies demand specialized personnel to master these technologies by achieving a perfect compatibility between man and machine. The new specialists' training cycles have become longer, but society must make sure that it has covered the entire cycle of the new technologies with personnel. To this end the developed countries have formed special policies for protecting the environment and training the new specialists.

The brief analysis of the world evolution of energy engineering reveals the entire complexity of the situation. Of course the problems cannot be solved by mere extrapolations but must be analyzed constantly with consideration of the multitude of economic, ecological, social and other problems involved. Among the present world trends, the nuclear alternative, those of using lower-grade fuels and promoting a strict energy conservation policy, and their corollary, faster growth of electric power production, are priority courses of action in Romania toward the goal set by the Party and its secretary general of securing Romania's energy independence in the shortest possible time.

\*/Megawatts electric7

### Share of Hydrocarbons in Energy Consumption Must Be Reduced

ALEXANDRU FLORESCU: Apparently spectacular reductions in primary energy inputs were made in Europe around the end of the 1970's. Consumption in 1981 was approximately equal to that of 1979 in the FRG, to that of 1978 in France, and to that of 1970 in England. These reductions, which amounted to 13 percent of the specific consumption of energy per unit of GNP in the OECD countries in 1973-1982, were not entirely due to the energy conservation efforts but in great part to the recession and the considerable decreases in industrial production mainly in the energy-intensive sectors. In 1981 steel production, for example, was down 10 percent from 1970 in France, 5 percent in the FRG, and 62 percent in England.

A superficial interpretation of the temporary improvement in the energy situation and of the recent developments on the petroleum market could lead to the wrong conclusion that the actions to conserve energy and use alternative energy sources are no longer urgent. But "reduction of incentives" in this field would preclude any future economic recovery, characterized by considerable increases in the demand for energy (4.2 percent annually in the OECD countries), and it would confront the countries of the world in general and those of Europe in particular with a new and probably more acute energy crisis.

In this light, the energy policy pursued in Romania in keeping with the goals and tasks set by the party and its secretary general in order to spur the development of the national energy system on in directions that will secure a high rate of economic growth, even under unfavorable energy conditions, has proved to be fully justified. The very pronounced development of the Romanian economy has been reflected accordingly in the evolution of energy production and consumption. The increase in the total industrial output by 34 times in the 1950-1980 period was accompanied by an increase in electric power production by 32 times and one in primary energy consumed by 9 times.

In addition to the general objective of reducing the energy inputs without interfering with economic activity or the standard of living, the shift to a new quality in the economy's energy supply requires an extensive effort to lower the proportion of hydrocarbons in the total consumption of primary energy. At present petroleum and natural gases account for about 70 percent of the total input of primary energy in the economy, and that proportion has to be reduced considerably if we are to attain the goal of meeting the whole primary energy requirement out of domestic resources. The Program To Raise the Technical and Qualitative Standards of Products, Reduce Consumption of Raw Materials, Fuels and Energy, and Make Better Use of Raw Materials and Materials in 1983-1985 and on to 1990 (approved at the Plenum of the CPR Central Committee of November 1983) stipulates that in order to conserve the energy resources, especially hydrocarbons and electric power, the assortment of installations for recovery of all reusable energy resources will be enlarged and steps will be taken to modernize the consumers' energy equipment in order to enhance energy productivity and to replace the higher-grade fuels.

Since industry is expected to consume about two-thirds of the primary energy requirement, that sector is naturally emphasized in the efforts toward rational energy management. One of the first major aims to be pursued in this direction is modification of the existing industrial technologies and promotion of some new

developmental measures so that the demand for the primary energy sources would be lessened and steered primarily toward the less scarce or renewable categories of resources (lower-grade solid fuels, water power, new and recoverable sources, nuclear energy). Some examples can be noted here of measures devised in Romania or expected to be devised and applied in the future, such as modification of industrial boilers and furnaces for use of solid fuel instead of fuel oil or natural gases or for use of lower-grade lignites; use of coal in the furnaces for manufacturing cement; use of bituminous shales for energy purposes; development of industrial and urban district heating in big power plants burning lignite; burning combustible household or industrial wastes in special steam or hot-water boilers; development of processes for drying by means of solar or geothermal energy in the wood and construction materials and food industries and in agriculture; and use of nuclear energy for electric power production and for urban and industrial district heating.

The following essential changes in the primary energy consumption structure are planned up to 1990 for the electric power sector:

	1980	1990
Hydroelectric power	17.6%	24%
Nuclear energy	-	17%
Coal	40.0%	44%
Hydrocarbons	39.7%	5%
Recoverable and new sources	2.7%	10%

This change in the electric power production structure is favorable for some more pronounced reductions of hydrocarbons consumption in the future through electrification of the technological processes in the other sectors as well. But we must bear in mind that not any electrification is always rational from the energy standpoint in the full sense of the word, that is in regard to the kind of primary energy consumed and the absolute value of the input for a certain useful effect. It is a clear and generally valid first requirement that arrangements will be made within the national electric power system so that the additional electric power produced that is essential to electrification will not, on the whole, cause greater inputs of hydrocarbons. For example, it is advantageous in this respect to use electricity for mechanical drives (in transportation and industrial assemblies and to replace heat engines and motors consuming petroleum products).

If electricity is used to produce heat (as contrasted with the other alternative of obtaining heat by burning fuel), consideration must be given not only to the local yields but also to the yield of electric power production, which as we know is considerably lower than the yields of direct heat production. Complete comparative analysis of the two alternatives shows that such an electrification is rational only if ways of modifying the technological process properly speaking are found at the same time, so that use of the properties of the electric current (electrical, magnetic, ionizing, flexibility in following the variations in consumption, etc.) will also result in a reduction by at least one-half of the quantity of necessary power or an equivalent reduction of the losses, a condition that is manifestly difficult to meet but not impossible. The results obtained in some situations through studies and applications in Romania and other countries demonstrate that the problem should nevertheless figure among the energy priorities.

The foreseeable evolution of the structure of the available primary energy sources and of the technologies in the energy sector and in the other industrial sectors makes for both a greater necessity and increasingly favorable conditions for intensified electrification of the economy. Of course this requires a special scientific research effort wherein both the energy engineers and the technologists in various industrial sectors will be involved to an equal extent.

#### Conservation and Rational Use of Energy

EMIL COSTIN: Economic growth, increase of the social product, and improvement of labor productivity and the living standard have always been closely related to production and consumption of energy and will also be in the future. Satisfaction of the energy requirements under the best possible economic conditions is one of the main factors stimulating worldwide and national economic development.

In Romania, energy independence has become the strategic objective upon which all the main trends of Romanian energy engineering are concentrated in the present period. Along with the steady efforts to develop the domestic energy resources by prospecting the entire national territory and by introducing some new energy sources into the energy reserve such as solar energy, wind power, geothermal energy, the energy contained in the biomass, etc., the energy conservation policy has acquired a key position among the efforts to make up the national energy reserve with internal forces. To this end a very wide range of both organizational and economic measures have been adopted in recent years, based upon restructuring and modernization of the technological processes and the various consumer devices, which measures resulted in reduced consumption of electric power per unit of output and per unit of national income. Of course the possibilities of reducing the energy inputs are far from exhausted, and the mechanism of the national economy still contains major reserves awaiting exploitation through regular and sustained efforts.

In the present national and international situation, minimizing energy consumption is becoming a main criterion in proportioning and evaluating any activity on either the macroeconomic or microeconomic level. To be sure the problem has no immediate or simple solution. Economic as well as technological research have a broad field for investigation here, since energy takes courses that are often long and very devious, both from production to use and later on in the process of incorporating it in products. This diversity of aspects is augmented by the nature of the production processes of the various sectors and of each individual activity, which will also characterize the degree of preparation of some statistical-economic and technical indicators so that they can convey precise information about the energy input per product both accurately and promptly.

The strategic policy promoted by the CPR and its secretary general to improve the structure of the economy must also be viewed in the light of the increasing effectiveness with which energy is consumed throughout the whole national economy.

In industry, the sectors of chemistry and ferrous and nonferrous metallurgy are outstanding consumers, characterized by high indices of electric power consumption per 1,000 lei of gross industrial output. In 1981 chemistry, for example, consumed about 116 kilowatt-hours to obtain a gross output of 1,000 lei. Ferrous metallurgy consumed about 76 kilowatt-hours to obtain a similar gross industrial

output, and nonferrous metallurgy consumed about 128 kilowatt-hours to obtain the same result. As contrasted with those sectors, the corresponding value logged in 1981 in machine building is about 19 kilowatt-hours, that in the textile industry is about 21 kilowatt-hours, and that in the food industry is about 12 kilowatt-hours.

The necessity of immediate reorientation of industrial production is even more apparent when we consider not only the proportion of a given sector's electric power consumption in the total industrial consumption of electric power but also, and to an equal extent, the contribution of each sector to the gross industrial output. This reveals that in 1981 chemistry accounted for about 25 percent of the total electric power consumed in industry but contributed only 9.2 percent of the gross industrial output. And metallurgy (ferrous and nonferrous) took a larger share (27.7 percent) of the total industrial input of electric power than its whole contribution (12.7 percent) to the gross industrial output, while machine building consumed less than 15 percent of the industrial electric power requirement but contributed over 31 percent to the gross industrial output. The textile and food industries took up considerably less (7 percent) of the total industrial electric power consumption than they contributed (18.7 percent) to the gross industrial output.

When we interpret the comparative data on the power consumption of each sector and its contribution to the gross output we can understand the great complexity of implementing the party's highly urgent policy of lowering the proportions of the energy-intensive sectors and more intensive development of the small consumers permitting better use of the resources. This restructuring, which has been considerably clarified and enriched theoretically since the 12th Party Congress, is aimed at preventing as far as possible the waste of production means usually involved in any restructuring action due to the huge volume of social labor housed in the productive units of every sector; faster production growth in the highly technical sectors of the processing industry; combination of the criteria of immediate and long-range effectiveness; comprehension and consideration of the trends in the world economy; securing the material and financial resources needed to develop the energy-efficient sectors so that this change in the options for development will not affect the processes of economic growth, etc.

The importance and complexity of the process of adjusting the national economic structure to the effects of the world energy crisis are also due to the fact that all states are in keen competition and farsightedness, efficiency and the technical level of the economy are the main keys to success.

As indicated by the series of provisions of the Program To Raise the Technical and Qualitative Standards of Products, Reduce Consumption of Raw Materials, Fuels and Energy, and Make Better Use of Materials and Raw Materials in 1983-1985 and on to 1990, approved at the Plenum of the CPR Central Committee of November 1983, consistent promotion of technical progress is a policy with good effects upon reduction of power inputs, from the standpoints of both productivity growth and actual reduction of the power inputs per unit of output. The fullest possible exploitation of this potential for energy conservation is also important because the specific consumption for certain products is still very high in Romania compared with similar ones abroad, and there are considerable differences even among some Romanian production units.

Electric power engineering was one of the first fields to which scientific forecasting methods were applied, since electricity has an essential property of being impossible to stockpile, so that it must be generated practically at the moment it is consumed. Moreover the manufacturing cycle for installations generating electric power has always been much longer than that of any consumer installation, so that when an electric power plant is designed there is no knowing in advance which consumers it will serve. Therefore the field of electric power engineering demands much more farsightedness than other fields, especially when it comes to power conservation measures, which are expected to affect not only the present situation but also, and perhaps particularly, the long-range aims so that the national energy reserve can be made up as soon as possible with achievement of the main strategic goal of Romania's energy independence.

#### Advanced Technology in Aid of Energy Conservation

MARCEL SIRBU: Energy has been one of the most discussed subjects in the world in recent years and it undoubtedly still is today. The petroleum crisis broke out in 1973 and was aggravated by some extreme measures taken by the countries producing and consuming much crude oil, leading to an avalanche that intensified the most serious world economic crisis. In 1980-1981 fuel prices increased by 9 times from 1972 and the general price index increased by about 4 times in the same period. Mankind suddenly awakened to reality when it realized that the world's reserves of conventional fuels are not only limited but also relatively close to drying up. It became apparent that unless effective measures are taken to restrict irrational consumption, to conserve energy resources in general and to investigate new energy sources on a wide scale to replace the conventional fuels in the future, we shall see the decline and perhaps even the destruction of the present civilization.

As it is now stated more and more often, the best source of energy is its conservation. Many states have taken national measures to reduce excessive inputs of energy and fuels and also to exploit some energy resources that used to be unprofitable but have become profitable due to the exorbitant world prices of petroleum. The United States' exploitation of the petroleum reserves in Alaska, those of England and Norway in the North Sea, the intensified exploitations at great depths, and the reopening of coal mines considered unprofitable 15 or 20 years ago may serve as examples.

The industrially developed countries have intensified studies to apply new technologies with limited energy inputs to all fields. New technologies have been introduced in the metallurgical, machine building and construction materials industries to lower the energy inputs. Redesign of thermal units, accelerated introduction of energy regenerators, etc. have begun. New kinds of transport means have been developed to minimize fuel consumption. New automation means have been introduced on a wide scale for rationalized operation of technological installations with minimal inputs of energy and fuels.

In this period the electronics industry has made a spectacular leap, proceeding to large-scale manufacture of microprocessors, which have invaded practically all possible fields of application in a few years and permit rationalization and automated management of technological processes. The electrotechnical, electronics and automation industry itself has become much more flexible in this period,

with its own greatly reduced inputs of materials, energy and fuels along with the increasingly extensive introduction of microelectronics.

Romania's accelerated progress in building the fully developed socialist society requires procurement of the energy sources essential to this rapid development. In view of the effects of the worldwide energy crisis and the current and long-range demands of the Romanian economy, it has become urgent to take the appropriate steps in the energy field in Romania too. Thanks to the farsightedness of Nicolae Ceausescu, a number of measures were taken before the onset of the energy crisis in 1973 to reduce excessive consumption and conserve the energy resources. In the years of the energy crisis Romania has enacted a number of laws standardizing industrial and household energy consumption and prepared specific measures to implement those regulations, making it possible to continue accelerated development of the Romanian economy with gradually reduced energy inputs.

The 12th Party Congress approved the Directive-Program for Research and Development in the Energy Field in 1981-1990 and Main Objectives up to the Year 2000, based upon the necessity of Romania's fuel and energy independence in the near future. To that end the program calls for exploration of all areas of the country to discover new deposits of coals, crude oil, gases and radioactive substances, as well as intensified studies to make use of the energy of the sun, wind, thermal waters and the biomass, with provision for gradual reduction of the share of hydrocarbons in the national energy consumption. Comprehensive measures are specified to make full use of the hydropower resources and the deposits of bituminous shales and also to implement an extensive program for nuclear-electric power plants. Steps have been taken to improve the organization and operation of the national electric power system and to enhance the entire system's safety in operation.

In the field of geologic exploration expanded investigation has begun throughout the whole country and especially at great depths and in the areas difficult to reach. Exploring is done with modern procedures and equipment. In order to meet the constantly growing needs, assimilation of new types of modern instruments and devices in Romania has begun in addition to imports of equipment for geologic investigation. Expansion of geologic prospecting for petroleum and gases at great depths and upon the continental platform of the Black Sea is a major objective. The Romanian machine building, electrotechnical and electronics industries are making an outstanding contribution to this field. They have provided and will provide modern apparatus and equipment to supply these capacities.

As for coal, studies have been intensified to discover new reserves of bituminous coal in Valea Jiului and of lignite and brown coal in the Oltenia region, Vilcea, the sub-Carpathian areas in Wallachia and Moldavia, in southeastern and northwestern Transylvania and the Banat. New and highly productive equipment has been introduced in all these capacities for surface and depth operations, with a high degree of control, protection and automation and manufactured in Romania (combines, high-capacity excavators, automated conveyor belts, etc.). Meanwhile explorations have been intensified for mineral raw materials to meet the fuel requirement of the nuclear-electric power plants, including investigation of the deposits with poorer contents for their exploitation.

Exploitation of Romania's hydropower potential has become very extensive in the last few years. Successive stages are planned that will permit complete

exploitation of Romania's hydropower potential by the year 2000. The Romanian machine-building industry's contribution to this field is telling, since nearly all the hydropower equipment and electric and automation apparatus essential to the hydroelectric power plants are now made in Romania.

Regarding the heat and electric power plants, the new constructions are based on lignite and bituminous shales and conversion of the power plants still burning hydrocarbons to solid fuels is to be accelerated. The thermal power units and the electrical and automation equipment of these plants are practically all made in Romania. Because of the particular complexity of these units as well as the difficult working conditions, there are still a number of shortcomings in the operation of some machines. Very intensive joint efforts are now being made by the specialists in machine building, electric engineering, electronics and the electric power field to gradually eliminate these defects and to raise the operating indices of the generating sets in the power plants.

Major power capacities are to be activated in the nuclear-electric power plants in the next five-year plan. Extensive scientific research and technological engineering forces are engaged in implementing this broad program, in order to manufacture equipment, prepare the fuel and produce heavy water as far as possible on the basis of Romanian designs.

In the field of new energy sources and technologies, projects are being implemented to improve exploitation of the sources of geothermal waters, to collect and use solar energy, to convert wind power and to utilize wave power. Special emphasis is being placed on biological conversion of carbon dioxide and the biomass to fuel.

A vital part in all these fields is played by the machine building, electrotechnical and electronics industries and especially the automation industry, which are to make a vital contribution by assimilating necessary new machine tools, equipment and instruments. As specified in the Program To Raise the Technical and Qualitative Standards of Products, Reduce Consumption of Raw Materials, Fuels and Energy and Make Better Use of Raw Materials and Materials in 1983-1985 and on to 1990, approved at the Plenum of the CPR Central Committee of November 1983, expanded mechanization and automation as well as use of advanced technology in general in all industrial sectors are to help reduce specific consumption of raw materials, energy, energy, fuel and materials.

The IPA /Institute of Scientific Research and Technological Engineering for Automation and Telecommunications/ is engaged with all its forces in implementing the national energy program. New solutions for automated control of extraction and transportation of crude oil and gases are now being determined in the institute, and new electronic automation instruments and equipment are being developed for that purpose. According to the adopted programs, introduction of these systems throughout the country will begin in a few years for purposes of making major savings in operations and increasing the output of crude oil and gases. Important projects have been and are being implemented in the institute for manufacture of some modern automation installations for surface extraction of coal. New automation equipment is also being designed for refineries and the petrochemical industry that will secure the uninterrupted operation of those vital capacities. Moreover new electronic automation systems are being developed for hydroelectric

and heat and electric power plants (for example, electronic regulators for hydro-electric power plants, equipment for control, signaling and protection, static excitation equipment for thermal units, and systems for long-distance control, signaling and measurement and also for computerized management of the electric power networks and the national power system). Meanwhile special emphasis is being placed on equipment of all power units with suitable measurement, control and automation apparatus permitting their correct operation with minimal consumption of fuel. For this purpose the IPA is developing a number of new transducers and control and regulation devices to be manufactured in the CIETA [Industrial Central for Telecommunications and Automation Equipment].

Conservation and better use of energy are state policies in Romania. Substantial growth of economic effectiveness in the use of fuels and electric power, on the basis of rapid promotion of technical progress, improvement of technologies, and adoption of advanced technical-economic procedures, is the chief source and the critical prerequisite for the further sustained development of the national economy.

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